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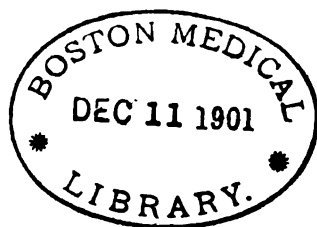
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 Moore, C. C., 2349 E. Cumberland
 Moore, John D., 1505 N. 19th
 Moore, H. D., 1528 Tasker
 Moorhead, W. W., 1523 Pine
 Morehouse, Geo. R., 2033 Walnut
 Morris, Caspar, 2050 Locust
 Morris, E. J., 128 S. 18th
 Morris, Henry, 313 S. 16th
 Morris, J. C., 1514 Spruce
 Morrison, W. H., Holmesburg
 Morton, G. D., 2048 Locust
 Morton, Thos. S. K., 1506 Locust
 Moss, Wm., Main and Chestnut Ave., Chestnut Hill
 Moulton, A. R., Pennsylvania Hospital, Department for the Insane
 Moylan, J. J., 228 E. Price St., Germantown
 Moylan, P. F., 1005 N. 6th
 Müller, A. F., 4753 Greene St., Germantown
 Munich, A. K., 145 Susquehanna Ave.
 Musser, J. H., 1927 Chestnut
 Musson, Emma E., 258 S. 16th
 Myers, T. D., 1703 Locust

 Nash, Jos. D., 1316 N. 11th
 Nassau, C. F., 1515 Wallace
 Neff, Jos. S., 2300 Locust
 Neilson, Thos. R., 122 S. 17th
 Neuber, S. T., 1855 Frankford Ave.
 Newbold, H. A., 3907 Walnut
 Newcomet, W. S., 3501 Baring
 Nightingale, H. B., 247 N. 6th
 Noble, C. P., 1509 Locust
 Noble, Wm. H., 2101 N. 13th
 Nock, Thos. O., 2507 Brown
 Numbers, W. A., 803 N. 8th

 O'Daniel, A. A., 1225 Walnut
 O'Farrell, G. D., 2317 E. Cumberland
 Off, Henry J., 121 S. 18th
 O'Hara, Michael, 227 S. 20th
 O'Hara, Michael, Jr., 42 S. 19th
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 O'Malley, J. M., 2217 S. Broad
 Ott, Lambert, 1531 N. 17th
 Owen, J. J., 411 Pine

 Packard, F. A., 258 S. 18th
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 Paist, Henry C., 536 N. 7th
 Pancoast, J. Wm., 1611 N. 13th
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- Parrish, Henry, 352 Scott St., Youngstown, Ohio
 Parke, Wm. E., 1739 N. 17th
 Patterson, F. W., 214 S. 15th
 Pearce, F. S., 1407 Locust
 Pearson, John S., 1507 Christian
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 Pennebaker, Benj., 4862 Tacony
 Pennock, W. J., 1422 N. 17th
 Penrose, C. B., 1331 Spruce
 Pepper, William, 1811 Spruce
 Perkins, F. M., 1428 Pine
 Perrine, E. K., 1831 Chestnut
 Peter, L. C., 2136 Oxford
 Phillips, J. L., 2213 Tioga
 Phillips, Horace, Pennsylvania Hospital for the Insane, 49th and Market
 Phillips, R. J., 123 S. 39th
 Piersol, G. A., 4724 Chester Ave.
 Pierson, John S., 1507 Christian
 Pilkington, Horatio, 4238 Paul St., Frankford
 Pitfield, R. L., 5450 Germantown Ave.
 Porter, Wm. G., 1118 Spruce
 Posey, Wm. C., 1835 Chestnut
 Potsdamer, Joseph B., 1333 Franklin
 Pottberg, Charles, 2338 N. Broad
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 Radcliffe, McCloney, 711 N. 16th
 Rainear, A. R., 2024 Diamond
 Ramsay, Alex., 103 E. Lehigh Ave.
 Ramsay, Robert N., 1124 S. 46th
 Randall, B. A., 1604 Walnut
 Ransley, A. W., 1315 S. Broad
 Reber, Wendell, 1208 Spruce
 Reckefuss, Charles H., Jr., 506 N. 6th
 Redmond, Henry, Corpus Christi, Texas
 Reed, Boardman, 1831 Chestnut
 Reeves, J. H., 1507 Walnut
 Regar, H. K., 1909 N. 13th
 Rehfuse, E. G., 1528 S. Broad
 Rehm, Victor G. R. J., 2008 Master
 Reynolds, Anna M., 1534 Dauphin
 Reynolds, J. P., 705 Spruce
 Rhein, J. H. W., 334 S. 15th
 Rhoads, E. G., 159 W. Coulter St., Germantown
 Rhoads, J. N., 1635 S. Broad
 Rhoads, T. L., Boyertown, Bucks Co., Pa.
 Richardson, Ida E., 256 S. 16th
 Riesman, David, 326 S. 16th
 Ring, G. O., 1442 N. 13th
 Risley, Samuel D., 1824 Chestnut
 Roberts, John B., 1627 Walnut
 Roberts, Norman, 4820 Baltimore Ave.
 Roberts, Walter, 26 S. 18th
 Robinson, Wm. D., 2012 Mt. Vernon
 Robertson, Wm. E., 912 N. 4th
 Rocap, Wm. A., Olney, Pa.
 Roche, C. P. de la, 1518 Pine
 Roderer, John F., 2446 N. 6th
 Rodman, Wm. L., 1626 Spruce
 Roe, W. J., 320 S. 11th
 Rosenthal, Edwin, 517 Pine
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 Rugh, J. T., 348 S. 15th
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 Sailer, Joseph, 330 S. 16th
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 Salinger, J. L., 1510 N. 8th
 Santee, E. J., 532 N. 16th
 Saylor, Edwin S., 1602 N. 16th
 Shaffer, Charles, 1309 Arch
 Schamberg, J. F., 1636 Walnut
 Schneideman, T. B., 112 S. 18th
 Schoales, Charles B., 1428 N. 11th
 Schweinitz, George E. de, 1401 Locust
 Schwenk, P. N. K., 810 N. 7th
 Scott, J. Alison, 1834 Pine
 Scull, Wm. B., 3038 Richmond
 Seabrook, Alice M., 2301 S. Broad
 Seiss, R. W., 213 S. 17th
 Seltzer, Charles M., N. W. Cor. Spring Garden and 19th
 Service, Charles A., City Line and Belmont Ave., Bala
 Sharp, Leedom, 331 S. 13th
 Sharpless, Anna P., 3926 Chestnut
 Shea, Wm. K., 1705 N. 18th
 Shellenberger, Joseph R., 5505 Main St. Germantown
 Shober, John B., 1731 Pine
 Shoemaker, J. V., 1519 Walnut
 Shoemaker, George E., 3727 Chestnut
 Shoemaker, Wm. T., 2031 Chestnut
 Shumway, Ed. A., 2007 Chestnut
 Shute, Harry A., 2145 Howard
 Simes, J. H. C., 2033 Chestnut
 Simcox, Lawrence, 5219 Ridge Ave.
 Simsohn, Joseph S., 909 Franklin
 Sinexon, Justus, 201 N. 20th
 Sinkler, Wharton, 1606 Walnut
 Siter, E. H., 2038 Locust
 Skidelsky, Rachel S., 523 Pine
 Skillern, P. G., 241 S. 13th
 Skillern, Ross H., 3509 Baring
 Skillern, S. R., 3509 Baring
 Skilling, M. J., 1635 Christian
 Slade, L. A., 4000 Spruce
 Slarkey, F. R., 4433 Baltimore Ave.
 Slaughter, Charles H., 1332 S. 10th

- Slocum, H. A., 1900 Chestnut
 Small, Wm. B., 2232 Green
 Smith, A. D., 6019 Germantown Ave.
 Smith, S. McC., 1502 Walnut
 Smitheman, Edward, 3510 Hamilton
 Smock, L. P., 3330 Chestnut
 Snively, I. N., 1617 N. Broad
 Somers, Lewis S., 3554 N. Broad
 Sparks, George W., 1022 Spruce
 Spellissy, Joseph M., 110 S. 18th
 Spencer, George W., 1838 Christian
 Spiller, Wm. G., 4409 Pine
 Sprissler, Theodore, 1151 S. Broad
 Stahl, B. F., 1502 Arch
 Staller, Max, 631 Catharine
 Steele, J. Dutton, N. E. cor. 40th and Locust
 Steinbach, L. W., 1309 N. Broad
 Stelwagon, H. W., 223 S. 17th
 Stengel, Alfred, 1811 Spruce
 Stevens, A. A., 314 S. 16th
 Stewart, A. H., 252 N. 12th
 Stewart, D. D., 1429 Walnut
 Stewart, Francis T., 919 Pine
 Stewart, Wm. S., 1801 Arch
 Stone, E. R., 1701 Master
 Stone, James F., 1806 Green
 Stout, E. J., 2422 N. Broad
 Stout, G. C., 34 S. 18th
 Stout, O., S. W. cor. 5th and Glenwood Ave.
 Strawbridge, George, 202 S. 15th
 Strecker, H. A., 337 S. 12th
 Strittmatter, I. P., 999 N. 6th
 Strobel, John, 948 N. 5th
 Strause, Fred M., 2220 N. Broad
 Swan, John M., 3713 Walnut
 Sweet, Wm. M., 1131 Spruce

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 Tappan, Lucy N., 123 S. 16th
 Taylor, Charles F., 1520 Chestnut
 Taylor, James Gurney, 6041 Drexel Road, Overbrook
 Taylor, J. J., 3709 Brown
 Taylor, J. M., 1504 Pine
 Taylor, Wm. J., 1825 Pine
 Taylor, Wm. L., 1340 N. 12th
 Teller, Wm. H., 1934 Green
 Thomas, C. H., 1907 Chestnut
 Thomas, F. W., 6 Mt. Airy Ave., Germantown
 Thomas, George P., 2123 N. 7th
 Thomson, A. G., 1426 Walnut
 Thomson, Wm., 1426 Walnut
 Thorington, James, 120 S. 18th
 Thornton, E. Q., 922 Spruce
 Trautman, B., 242 Franklin

 Tucker, Henry, 19 S. 21st
 Tull, M. G., 4626 Baltimore Ave.
 Tunis, J. P., 16 N. Delaware Ave., care of U. S. S. Saratoga
 Turnbull, Charles S., 1933 Chestnut
 Turner, John B., 1525 Christian
 Tyson, James, 1506 Spruce
 Tyson, T. M., 1506 Spruce

 Umstead, Wm. M., 1624 N. 25th
 Updegrove, Silas, 652 N. 8th

 Vanderslice, Ed. S., 127 S. 5th
 Van Gaskin, Frances C., 2131 Fitzwater
 Van Harlingen, Arthur, 117 S. 18th
 Vansant, E. L., 1929 Chestnut
 Veasey, C. A., 116 S. 19th

 Wadsworth, Wm. S., 227 S. 36th
 Walk, James W., 737 Corinthian Ave.
 Walker, Gertrude A., 125 S. 16th
 Walker, James B., 1617 Green
 Walsh, Joseph P., N. E. cor. 48th and Cedar Ave.
 Wamsley, James W., 1223 Spruce
 Ward, E. T., 843 S. 3d
 Warder, Charles B., 1305 N. Broad
 Warder, Wm. H., 1212 N. Broad
 Watson, A. W., 126 S. 18th
 Watson, Edw. W., 131 N. 20th
 Watson, W. N., 4110 Parkside Ave.
 Webb, Wm. H., 556 N. 16th
 Weintraub, Sarah L., 1511 S. 9th
 Welch, Wm. M., 821 N. Broad
 Wells, J. R., 5138 Lancaster Ave.
 Wells, P. F., 4023 Brown
 Wells, Wm. H., 333 Pine
 Wendell, W. G., N. E. cor. 45th and Baltimore Ave.
 Wentz, B. W., 6439 Darby Road
 Werner, Ellis Bruce, 3805 Baring
 West, John W., 1125 Wallace
 Westcott, T. S., 1833 Spruce
 Wetherill, H. M., 1506 Pine
 Wetherill, Henry E., care of Surgeon-General, Washington, D. C.
 Wharton, H. R., 1725 Spruce
 Wheeler, E. B., 1918 N. 8th
 White, Francis, 1648 Franklin
 White, J. W., 1810 S. Rittenhouse Sq.
 Whiting, A. D., 1523 Spruce
 Whitman, J. G., 2030 Wallace
 Wiley, Eugene, 330 Reed
 Wiley, H. E., 330 Reed
 Willard, De Forest, 1818 Chestnut
 Williams, C. B., care of J. T. Morgan & Co., London, England
 Williams, H. L., 15th Ave. and 7th St., Minneapolis, Minn.
 Williams, Horace, 1717 Pine

Willits, I. P., 6135 Germantown Ave.	Woods, Mathew, 1307 S. Broad
Willits, Mary, State Hospital, Norristown, Pa.	Woods, Richard, 1501 Spruce
Wilson, H. A., 1611 Spruce	Woods, Walter V., 848 N. 41st
Wilson, J. C., 1437 Walnut	Woodward, George, Wissahickon Heights
Wilson, Samuel M., 1517 Arch	Wray, Wm. S., 26 S. 18th
Wilson, W. R., 112 S. 20th	
Winter, S. Elizabeth, Inwood, W. Conshohocken, Pa.	Yard, John B., 327 S. 18th
Wirgman, Charles, 2021 Pine	Yarrow, Thomas J., 1335 N. Broad
Wise, George G., 420 S. Broad	Yeager, Frank N., 2826 Oxford
Witmer, A. F., 332 S. 15th	Young, James K., 222 S. 16th
Wolff, Laurence, 333 S. 12th	
Wolfe, Samuel, 1701 Diamond	Zentmayer, Wm. J., 1423 Walnut
Wood, A. C., 1501 Walnut	Zeigler, S. L., 1509 Walnut
Wood, H. C., 1925 Chestnut	Ziegler, William H., 3028 Frankford Ave.
Woodbury, Frank, 218 S. 16th	Zeigler, W. M. L., 1418 N. 17th
Woods, D. F., 1501 Spruce	Zimmerman, M. W., 1522 Locust
	Zuill, Wm. L., 659 N. 15th

HONORARY MEMBERS.

Browne, Lennox,	London, England.
Eskridge, J. T.,	Colorado Springs, Colorado.
Ferguson, E. D.,	Troy, New York.
Jackson, Edward,	Denver, Colorado.
Kerr, John G.,	Canton, China.
Pavy, Frederick W.,	London, England.

DECEASED MEMBERS, 1900.

John Ashhurst, Jr., M.D.,	R. M. Girvin, M.D.,
Amy S. Barton, M.D.,	F. B. Hazel, M.D.,
R. R. Bunting, M.D.,	Frances Hatchette, M.D.,
J. H. W. Chestnut, M.D.,	T. S. Kirkbride, M.D.,
H. G. Costello, M.D.,	George A. Muehleck, M.D.,
Emil Fischer, M.D.,	Alfred Stillé, M.D.,
J. S. Gillespie, M.D.,	A. L. A. Toboldt, M.D.

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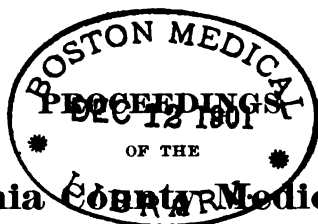
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Philadelphia County Medical Society



VOL. XXI.

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No. 1.

Introductory Remarks.

By S. SOLIS-COHEN, M.D.

[Made at a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

In calling the meeting to order, Dr. S. Solis-Cohen said that the present meeting was a departure in the methods of the County Medical Society. It hoped through joint discussions to bring about more intelligent co-operation between physicians and the members of the general community in the preservation of the public health, and in the relief of suffering. The subject of the evening "The Duty of the State Toward Those Afflicted with Pulmonary Tuberculosis" was specially fitted for such discussion. The physicians would state authoritatively, as they had the right to, that consumption is to be ranked among preventable diseases and that the measures for its prevention are simple and easily carried out. First is the improvement of vital resistance by open air, pure water, sunlight, good food, wise alternation of rest and exercise; second, the avoidance of infection by proper care of sputum and by certain measures of disinfection of a public nature. It is necessary, however, for the community to be educated in this knowledge and these methods. The State—speaking collectively—must realize that it can help in this teaching, and that it can, without exceeding its legitimate functions, make provision not only for such education, but also for public parks well distributed throughout the city, for regulating buildings and streets to afford sufficient air space and sunshine and moreover for the practical illustration and the application to the cases of the poor in properly equipped sanatoria, of the advanced methods now employed for the treatment of the disease; methods by which its mortality has been greatly lessened, and numbers of patients who, twenty-five years ago,

would have been considered doomed to death have been restored to the ranks of useful citizens. While the physicians would speak of the medical aspects of the question, they looked to the city and State officials, the hospital and charity workers, and other public-spirited citizens present to discuss it from the business and executive view point, in the hope that the conference would not simply begin and end in talk, but have a practical outcome. Philadelphia as the medical centre of the United States, should not be behind other cities, but should lead them in solving this problem, the more so as the proper housing of the people, one of the greatest factors in the prevention of consumption, ought to be best accomplished in "The City of Homes." This, while of course an economic question, should not be entirely lost sight of.

Plans of the Pennsylvania Society for the Prevention of Tuberculosis.

BY L. F. FLICK, M.D.

[Read at a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis. January 10, 1900.]

The technical name given to this meeting is the meeting of the Philadelphia County Medical Society; the name on the programme is a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis: a still better name would be a meeting of the people, of men and women interested in humanity and philanthropy, and interested especially in stamping out a disease which has been a great plague for centuries, a disease which is now preventable.

The reason for the existence of the Pennsylvania Society for the Prevention of Tuberculosis is that this great plague, tuberculosis, can be stamped out. If the feasibility of this had not been demonstrated it would have been ridiculous to organize a society for such a purpose. When the Society was organized it had not only been clearly demonstrated, beyond possibility of doubt, that consumption could be stamped out, but also that the measures for bringing about such a result were comparatively simple and easy.

The Society then laid down for itself a programme which it believed would lead to the results at which it aimed. That programme was, first of all, education. Education of the people, not only of the legislators, but of the entire people. This it sought to bring about mainly by the distribution of tracts upon tuberculosis: how individuals can avoid

taking the disease ; how persons suffering from the disease may avoid giving it to others ; what store-keepers, hotel-keepers, and so on might do to aid in the prevention of the spread of the disease.

The Society advocates as a further measure for prevention the registration of tuberculosis both in human beings and in domestic animals. For such a measure there are the best reasons but there is still opposition to it. Hence to-night it had better not be discussed.

The Society would, however, like to take up a measure, to-night, to which there is no opposition in the medical profession, and to which there can be none on the part of any thinking being : the establishment in cities of hospitals for the treatment of advanced cases of consumption, and the establishment, in mountainous regions accessible to the cities, of sanatoria for the treatment of incipient cases. By the introduction of these two measures, alone, it is believed tuberculosis can be stamped out in a comparatively short period of time. The feasibility of this has been put to the practical test. In Italy, over a hundred years ago it was tried, with the best results and in England during the last forty or fifty years a reduction of 50 per cent. in the death-rate from consumption has been brought about by the establishment of consumptive hospitals. The hospitals in England were not established for the purpose of stamping out tuberculosis, but from humane motives only. England has had hospitals for advanced cases mostly, and like ourselves is at present considering the question of establishing sanatoria for incipient cases.

For the programme to-night let us confine ourselves to this important question, the establishments of hospitals and of sanatoria. We can approach the question from a humane point of view as well as from a sanitary one. There can be no hardship to a consumptive in offering him the opportunity of being treated in a hospital. Let no one have the idea that we advocate compulsory isolation. No one who knows anything about this subject would ever think of such a thing. I can assert from personal knowledge that hundreds of poor consumptives are knocking at hospital doors for admission and are denied admission. Our general hospitals cannot and will not take them in, and until we establish properly equipped hospitals not only for the early cases but for the more advanced, we are not doing our duty to humanity.

If I could take this audience into the homes of the poor consumptives, where, year after year, there is death, where year in and year out for eight or ten years in succession there is never a single day of health, where there is insufficient food, warmth and clothing, and where often the entire family one by one succumbs to the disease, I am satisfied,

that no one would go away from this hall without making a firm resolution to do something for the amelioration of the suffering of these poor people. I am sure that as soon as every man, woman and child who can give any thought at all to the subject, has properly understood what is meant by giving hospital treatment to the consumptive poor, the people will rise as one man to extend the helping hand. Moreover, I may throw out this further incentive, that, when we will extend that hand, we will not only extend it to our fellow creatures, but to our families and our posterity, because we will gradually remove from ourselves and from those who will come after us the danger of contracting this dreadful disease.

The Necessity for Isolation and Hospital Care for Poor Consumptives.

BY JAMES C. WILSON, M.D.

[Read at a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

Twenty-five years ago Ruehle, a famous physician of Germany, Director of the Medical Clinic at Bonn, wrote concerning pulmonary consumption the following words: "The importance of laboring to check the spread of this deadly disease and to diminish the number of its victims has never seemed to be so urgent as at the present time, when there is a growing demand for more attention to the preservation of health and when the conviction is gaining ground that this is the main function of medical science."

How true these words to-day; yet the learned writer, in his elaborate article upon "Pulmonary Consumption" in Ziemssen's *Cyclopædia*, immediately added: "It were idle to suppose, much more to reasonably expect, that we shall ever be able to extirpate consumption from the human race."

Fortunately for mankind this gloomy prediction has, with advancing knowledge, lost its impressiveness. In 1882, seven years later, Robert Koch made known to the world the actual cause of the tuberculous diseases, including pulmonary consumption, in the tubercle bacillus. This discovery marked a new era in medical history. With it, bacteriology assumed an established position among the medical sciences. With it the mystery that surrounded pulmonary consumption came to an end. Doubts and uncertainties remained and still remain, but the matter passed from the region of uncertain hypothesis to that of scientific fact. Pulmonary consumption ceased to be an unknowable scourge due to

manifold, adverse, obscure conditions, and presented itself in the simple aspect of a chronic infection caused by a definite pathogenic principle, transmissible from individual to individual.

As this view concerning the nature of the disease became more clear, the three great stumbling-blocks which stood in the way of the advance of knowledge relating to the disease were destroyed. These were, first, the doctrine that pulmonary consumption is essentially hereditary; second, that it is incurable; and third, that as a scourge of the human race it is ineradicable.

The medical profession is in the position, to-day, to assert: First, that the disease, except under rare and unusual circumstances, is not hereditary, and that in point of fact the vast majority of cases arise in consequence of infection by the tubercle bacillus, that is to say, the transmission of the exciting cause of the disease from the sick to the well. Second, that the tuberculous diseases, including pulmonary consumption, cannot in the present state of knowledge be regarded as incurable, but that a majority of the cases are, if seen early and placed under favorable conditions, amenable to treatment and capable of being restored to health; under these circumstances the individual case ceases to be a focus or source of infection. Third, it naturally follows that the tuberculous diseases, which cause one-seventh, or 14 per cent. of the deaths in the civilized world, might by the general enforcement of proper sanitary regulations be stamped out or, at all events, enormously restricted in their prevalence. Facts familiar to the student of medical history in regard to the plague in Western Europe, to leprosy in the British Islands, and to typhus fever justify this assertion. There are those who will address you to-night who not only believe that pulmonary consumption and the other tuberculous diseases might be ultimately stamped out, but who are even sanguine enough to hope that this blessing to humanity might be brought to pass during—and constitute the crowning achievement of—the coming century.

I cannot say that I wholly share in this sanguine expectation, but the time has arrived when the civilized world should be aroused from its apathy in regard to the subject.

The individual suffering from pulmonary consumption becomes a focus of infection and in a very definite way. Whether the case be acute or chronic, so soon as necrosis of the lung occurs—that is, so soon as ulcerative processes develop—tubercle bacilli are thrown off with the sputum. This organism is practically an obligate parasite, growing and developing freely within ranges of temperature not very greatly exceeding that of the bodies of animals, and requiring moisture and

oxygen. Nevertheless, outside of the body it preserves its vitality and capacity for new growth under favorable circumstances for a considerable period. While the expectoration remains moist or when it is discharged into vessels containing water it is innocuous, for the conditions in which the expectoration in the moist form is conveyed to the interior of the bodies of susceptible individuals are exceedingly limited. When, however, the expectorated matters are allowed to dry in handkerchiefs or upon the clothing of the patient, or upon the floor of the room which he occupies, they are ultimately converted into particles of dust, and floating in the atmosphere are inhaled by other individuals in the vicinity. These are familiar facts. They of themselves suggest practical measures of prophylaxis. The people must be taught that the disease is a transmissible one, and that in the vast majority of instances transmission is indirect by means of particles of dried sputum containing the tubercle bacilli and floating as dust in the atmosphere. They must be taught that the chief measure of safe-guarding those in the neighborhood of the consumptive consists in the collection and destruction, preferably by fire, of the sputa. They must be taught that the disease is not necessarily an incurable one, but, that if taken in time, many of the cases, probably a majority, are amenable to treatment. They must be taught that it is better for a man suffering from a beginning consumption to give up his work and place himself under proper conditions to be cured than to struggle on, working until he breaks down beyond hope of cure. The consumptive in the mill, in the factory, in the office, in the school, in the sweat-shop, in the church, in public places of amusement and recreation, and in his home is a menace to the health of those surrounding him. He infects localities, he renders the atmosphere in which float the dried particles of his expectorated matter baleful.

The period of incubation of pulmonary consumption is often a long one. It is rarely possible to trace the direct connection between the infecting sick person and the well person who receives the infection; hence arise difficulties that surround the question of transmissibility. But the closer the matter is studied the less important these difficulties become.

It is more than useless to teach the people, especially the working people, the facts concerning the spread of tuberculosis and not to point out the remedy. It is cruel.

The remedy is a very obvious one. It is based upon the simplest principles of preventive medicine. It demands the fulfilment of a public duty. State and local governments provide and maintain institu-

tions for the care of the poor and especially for the care of the sick poor. But the consumptive of the laboring classes, when he most requires help for himself and safeguarding for the public, is usually neither sick nor poor. Before long he is both, and the cause of sickness and poverty in others. Then he is commonly past help. At no time is the almshouse or the general hospital the place for him. Asylums are provided for the insane, in order that the curable cases may be properly treated, the incurable suitably detained and society protected against the violent or homicidal. The danger from the lunatic at large is an episode; that of the consumptive a scourge. Hospitals are established for contagious diseases, incidentally that the sufferers may be cared for, primarily for the protection of the people and the prevention of epidemics. The welfare of the people has made it right to throw around these institutions and those who are proper subjects for admission to them the protecting arm of the law. Yet the consumptive, whose need is sorer as his number is greater, turns in vain for help. If in any great community smallpox or diphtheria or yellow fever were to prevail to the tenth part of the ordinary number of cases of consumption, depopulation would at once take place; the people would not stay. Among well-to-do persons the danger is comparatively slight. Education, refinement, decent ways of living are a safeguard. Such people can avail themselves of travel, of health resorts. For them long journeys and favorable localities are practicable. They can go to Görbersdorf, Falkenstein, Nordrach. For them the regular supervision of competent medical men is possible—constant attention, proper diet, courses of medicine, treatment in emergencies, hygienic conditions, agreeable surroundings. For the poor consumptive all these are wanting. For him only the daily struggle to the end, and disaster not only to himself but to those about him. The establishment of special sanatoria to which the incipient cases can be sent, and special hospitals for advanced cases, is the solution of the problem. Cases at the curable period should be sent to such institutions—not on commitment, but voluntarily—since in such a plan only is hope—hope for him and for those around him. The earlier he is to go the greater the hope of cure. There are difficulties, but they are not insurmountable. Such institutions can be built in any climate, in any well-drained upland locality. There are sentimental difficulties, but those will lessen as knowledge increases. We cannot exalt the feelings of the individual above the safety of the community. The question of arrest of earning power is a difficult one. But the incipient case in many crafts can still work in the sanatorium, and new methods of insurance covering such cases are to be thought of. If we are to

arrest the progress of this great scourge, special institutions for the care of tuberculous diseases in the working classes and the poor, at all stages of the disease, are an imperative necessity.

The Work Being Done Through Private Charity in the Case of the Consumptive Poor.

BY THE HON. W. N. ASHMAN.

[Read at a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

Manifestly this question cannot be literally answered. Of the benefactions which pass directly from the individual giver to the individual recipient no record is kept, and no estimate can be ventured. The only field from which statistics may be gathered is that covered by organized agencies, and as these are endowed and largely maintained by individual donors the figures which set out their work may very properly be put under the head of private charity. It is not a matter for congratulation that the showing for Philadelphia is startlingly meagre.

The deaths from consumption in this city head the mortuary list in every year. For ten years ending in 1891 the total deaths from all causes were 209,257; from consumption 27,478, a rate of more than 13 per cent. For the year 1898 the deaths from consumption were 2590, nearly 11 per cent. of 23,790, the total mortality.

The majority of the victims must have come from the ranks of laboring people and from the very poor, because we know that exposure to the weather, insufficient clothing, indifferent food, and crowded and unsanitary lodgings and work places are the weapons with which this disease does its deadliest work. Instances have come under my personal observation where from one or more of these causes young persons upon whom the support of a family has temporarily or perhaps permanently been cast have contracted a cold which would have yielded to rest and careful treatment. But rest meant the stoppage of wages and famine in the house, and even if rest were possible there was absolutely no institution in Philadelphia, outside of the almshouse, where these unfortunates could be cared for. I am thinking just now of a young girl, who had been tenderly reared, and whose family, by reason of the disability of the father, were forced to practice the small economies of the poor. She was employed as a saleswoman in a store, and earned, for a person of her years, large wages, every cent of which went religiously to the

maintenance of the home. To save car-fare she walked to the store on a stormy morning and stood with wet feet all day behind the counter. She was taken ill, and when friends called to see her they found that although her home had the aspect of neatness and refinement, it was without food or fire. Aid, of course, was given, but it was given too late. Hundreds of tragedies like this are enacted in our midst every winter, and it seems as though no accessories were wanting to darken their plot. Under the conditions just described the disease, according to all medical testimony, is contagious, and when it gets a foothold is not likely to be content with a single victim. The result is simply appalling. It represents not only the demoralization which springs from hopeless suffering and poverty, but also a positive loss to the community by the withdrawal of a host of wage-earners who otherwise would contribute to the public wealth. Its very worst feature is a moral one, and all the evil could be ameliorated and much of it prevented if the proper appliances were provided.

There are only three institutions in the city of Philadelphia whose specific purpose is the treatment of consumption, and I am glad to say that their object is distinctly charitable.

The oldest of these is the Home for Consumptives (popularly styled the Hospital for Diseases of the Lungs), which is located at Chestnut Hill, connected with which and forming a branch of the charity is the House of Mercy for Male Consumptives, located at 411 Spruce Street. During the year ending April 15, 1899, the inmates in the Home for Consumptives numbered 110, of whom 36 remained at the close of the year; in the House of Mercy 45, of whom 10 remained; and 43 were treated at their own residences. The institution, for it is, properly speaking, one charity, is conducted by the P. E. City Mission. It was organized in 1877, and in twenty-two years has treated 2613 poor consumptives, a yearly average of 119 patients.

The next in order of time is the Rush Hospital, an incorporated charity which has been in continuous operation for eight years. Its grounds front on Lancaster Avenue and on Thirty-third Street. In 1895 it treated 49 resident patients; in 1896, 62 patients; in 1897, 62 patients; in 1898, 66 patients, and in eleven months of 1899 (its fiscal year ending January 31, 1900), 93 patients. In 1899 a wing was added to the original building, giving a capacity for forty beds. Two of these are endowed, for which the hospital has a trust fund invested of \$10,000, the gift of two generous benefactors. Its dispensary department has furnished medicine and treatment to hundreds of outside patients.

The third of the charities referred to is the Free Hospital for Poor

Consumptives. This is the corporate name of a society, which has no building of its own, but which aims to provide hospital treatment in existing hospitals, or in a hospital to be built, for the consumptive poor. It was incorporated in 1897, and in that year secured admission in hospitals for seventy-six cases, each of which was treated for an average period of nine weeks. The cost to the society exceeded \$5000, and the hospitals selected were St. Agnes' Hospital, St. Joseph's Hospital, and Rush Hospital.

With the exception, so far as known, of St. Agnes' Hospital, which has been already referred to, these three institutions fairly represent the quantum of free hospital treatment given to the consumptive poor of Philadelphia. Of course, their work is supplemented by that done through the dispensaries of other hospitals and by noble agents of beneficence, of which the sick diet kitchens of the P. E. Mission and the Society for Organizing Charity are types. But these charities, either singly or collectively, do not profess to furnish the rest, food, and medical attendance which the nature of the disease imperatively demands.

The case stands thus: In 1898 2590 persons died in this city of consumption of the lungs, and only 297 patients were inmates of the hospitals for consumptives during a fraction, certainly not amounting to six months, of that year. That this method of relief is wholly disproportioned to the extent of the evil is not, however, the fault of the wealthier classes of our population, because these have shown by many and munificent benefactions that they regard their abundance as in some sense a trust fund for the welfare of the needy. The simple explanation is that the magnitude of the evil has not been brought home to their consciousness. A few weeks ago a gentleman, in handing to the treasurer of the Rush Hospital the sum of \$5000 for the endowment of a free bed, remarked that he had never known what consumption actually was until the death of his wife from that disease a few months before. Yet her last hours were soothed by all that the resources of wealth and affection and professional skill could furnish. I would not, if I could, picture the gloom of the sick chamber where the watchers are unable to procure the trifling delicacies, the medical aid, or even the bare comforts of life for the stricken member of their household. What the charities just named have done is as nothing compared with what they can do and what they will do if their hands are strengthened. We are all agreed that a State sanatorium for the care of consumptives, to be located with a special view to climatic conditions, is a necessity, but we are equally convinced that a hospital devoted to that class of

sufferers is as truly a necessity in every large city. This truth has been recognized and acted upon in every great capital of Europe. The city of London has six special hospitals for consumptives, one of which—Brompton Hospital—is known over the world. The establishment of a similar charity in the city of Philadelphia would be a fitting monument with which to mark the close of the century.

[NOTE.—Since this was written, I have ascertained that the Jewish Hospital of Philadelphia has set apart ten free beds for consumptive patients. —W. N. A.]

The Necessity for State Aid in the Treatment of the Consumptive Poor.

BY HOWARD S. ANDERS, A.M., M.D.

[Read at the Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

It is my task to show that the tuberculosis problem is too great and too vitally urgent to be solved by the charitably disposed, alone; that it is a matter of governmental duty, as well as of philanthropic opportunity; and that upon the State even in its broadest political sense, including the nation and municipality, as well as the Commonwealth, rests the obligation of justice and providence in this matter, not less than does the altruistic love of the philanthropist pour forth from his heart and take shape in good works by his hands.

The necessity for State aid, in the care of the tuberculous and in the prevention of tuberculosis, like proverbial necessity, "*knows no law*;" but it is high *time that statute law should know and meet this necessity*.

There are four reasons why this should occur: first, the argument from history; secondly, the argument from achievement; thirdly, the argument from analogy and safety; lastly, the argument from economy.

1. *Historical*.—While the history of the movement for public sanatoria, for the consumptive poor, is of very recent development, it is packed with events of clearest significance. In the last two years, alone, more interest has been awakened in this subject, more organizations effected, and more actual work accomplished than in all the preceding years of the century. So earnest, energetic, wide-spread and influential has been the agitation in Europe lately, that it has been called the "War against Tuberculosis," the "Fight against Consumption;" and now, here in these United States, we are entering upon "The Anti-tuberculosis Crusade:" but the crusade is scientific and sympathetic,

not fanatic ; and practical, not emotional ; and the war is truly one for the liberty of the poor consumptive, and for the extermination, if possible, of this " Great White Plague." As the people are to be aroused in the crusade, so the many governments are to be asked and induced to aid by giving authorization, support, organization and extension in the conduct of the war.

While the movement for free hospitals and climatic sanatoria for the consumptive poor was inaugurated by public charity (in England), governmental aid is being sought and enlisted in a most encouraging manner. In Germany, England, Scotland, Ireland, Sweden, Belgium, Holland, France, and in Spain, Roumania and the Argentine Republic, even, the public agitation for sanatoria for the consumptive poor has met and is meeting with good results. Physicians and philanthropists, together, usually begin the work of establishment, and governmental sanction and aid, to a degree, follow sooner or later. The royal families of Europe have not failed to contribute of their sympathy and substance. The first International Congress of Tuberculosis, held in Berlin last spring gave the matter tremendous added impetus. The Prince of Wales, not long ago, presided at a meeting of some of the most influential officials, philanthropists, and medical scientists in Great Britain, met to discuss the problem and to devise ways and means for the prevention of tuberculosis, and for the care of the poor consumptives, of which nearly a hundred thousand exist in England to-day.

In the evolution of the care of consumptives, State aid is truly an opportune, just and consummate factor. First the private pay sanatorium ; then the hospital for poor consumptives maintained by voluntary contributions ; and now the public hospitals and sanatoria for advanced and incipient cases respectively. England has accommodation for about 5000 poor cases supported by charity only, leaving about 70,000 cases more, unprovided for. Germany has about fifty sanatoria, but mostly for pay cases of tuberculosis, although, many more for the poor are in process of installation by the government and by private enterprise, separately and co-operatively. The Swedish Parliament recently voted 850,000 kroner for a sanatorium for South Sweden ; and 2,200,000 kroner given by the people to King Oscar has been turned over by him for sanatoria in northern and central Sweden. These are a few instances showing the trend in Europe.

Now, while we, in America, are behindhand in respect to agitation, organization, and adoption, the rising wave of interest and activity is very hopeful in the direction of awakening the legislative sense of obligation and of obtaining legislative assistance in the near future.

The New York State Board of Health went on record last September as favoring the municipal control and management of hospitals for the tuberculous poor, and urged the early construction of a \$200,000 State sanatorium in the Adirondacks. Further, the New York legislature passed a bill enjoining the managers of the larger hospitals against intermingling in their wards tuberculous cases with acutely diseased cases, especially those pulmonary in character, and authorizing the large cities to establish rural hospitals for consumptives. Massachusetts, superior in her support of education, has likewise led and shown the way in this, that she now has in operation a \$150,000 sanatorium at Rutland.

For our encouragement, it should be noted that the Illinois Society for the Prevention of Consumption and a committee of citizens are in a fair way to securing legislative aid for a sanatorium with a capacity for 300 patients. Indiana, and several other States and cities are also taking hold of the movement, begun often by charity, and setting an example to municipal and State government officials and legislators.

Nor is the national government unmindful of its expanding obligations, since not long ago it opened a sanatorium at Fort Bayard, New Mexico, for tuberculous officers and enlisted men. Hence, I conclude that recent history establishes the point that State aid is a recognized necessity.

2. *Achievement*.—This might with almost equal propriety be termed the argument from *lack of achievement*. Thus, the negative side may first be presented by calling attention to the magnitude of an unsolved problem; the generally unrealized, unchecked and enormous prevalence and mortality-rate of pulmonary tuberculosis. Let us face the immensity of what is and should not be, and what has not been done, that we may the better understand what should be done.

Osler estimates that there are over one and a quarter million cases of consumption in the United States at all times,—one person in fifty is affected with tuberculosis. The disease kills four and one-half times as many people as small-pox, scarlet and typhoid fevers, and diphtheria combined. Approximately, 50,000 cases and 13,000 deaths occur from consumption in New York State annually. In New York City, there are deaths from tuberculosis in 23 per cent. of all the dwelling houses. In Pennsylvania, there are about 20,000 cases, with about 5000 deaths from this disease alone. Roughly stated, in a group of cities with an aggregate population of about ten millions, in 1897, there were a little more than 20,000 deaths from tuberculosis, or a death-rate of a little over twenty per 10,000 people. About one in 520 persons in Philadelphia die of consumption; while in McKean County, Pa., only one in

1300 so dies. And yet, what has the State done, what, philanthropy even, toward establishing a sanatorium in the healthful regions of the latter or a dozen other equally suitable county climates, for the consumptive poor of the former great city?

But, the problem is too great for charity alone; the State must face its obligation. If tuberculosis were incurable in all cases, there might be some extenuation of the charge of apathy and neglect. When, however, from 24 to 40 per cent. of the cases under sanatorium treatment are curable, as the statistics of European and three American institutions show, then surely something palpable ought to be done for the tens of thousands that these percentages represent. In brief, we have here the *positive side* of the argument from achievement, as indicative of the necessity for State aid by reason of the results obtained and obtainable.

3. *Analogy and Safety*.—Writes Mathews: "The blind, the deaf, the insane, the feeble-minded and other classes are provided for; why not these (the tuberculous)? They are not able to care for themselves and they are a menace to the public health." If public safety demands State provision for the isolation and support of the insane and other defectives or degenerates, then by analogy should it provide also for the consumptive poor, because of their numbers, their needy conditions, and because of the dangerous foci of transmissibility that they become when not segregated. The State of Pennsylvania cares for 6000 insane, for 7000 criminals, 3000 feeble-minded, deaf and dumb, and blind, all told, and for 12,000 paupers; then why not for at least 10,000 or 15,000 of the consumptive poor? The State does not even make any adequate special provision for the tuberculous among the insane, 15 per cent. of whom die of tuberculosis.

In 1898 Pennsylvania appropriated \$843,800 for general hospitals, only \$18,000 of which were distributed for the twelve most healthful and finely forested counties, where for sanatoria alone one-half the total of that general hospital appropriation might and should be expended for the tuberculous poor. There is no need for more general hospitals, but there is most imperative need for special State hospitals near the great municipal centres for advanced cases among the consumptive poor, that the general hospitals refuse to admit; and also for climatic sanatoria for the incipient cases. It is not a heartless injustice for the general hospitals to decline consumptive cases, when unequipped with special isolation wards, and poorly situated, rendering it likely for others in the hospital to contract the disease in their weakened conditions, or for those affected to die because of a depressing environment;

but it is a heartless injustice, if not due to excusable ignorance or to indifference, for the State to refuse to make prompt and special provision for these cases.

Again, State aid is needed, and would facilitate much, because the best climatic advantages for sanatoria are often in many of those regions where State forestry reservations are maintained. The aid and authority of the State is needed also because, in the establishment of sanatoria, segregation, now unthought of by the sufferers, would be encouraged by the hope of relief or cure, and the increased number of applications would thus reveal many foci of infection. In the words of Rothrock : "The State should protect itself, provide for its perpetuity." Municipalities, Commonwealths and nations are not learning fast enough that one of the highest functions of government is the preservation of the health of the people. We have a constitutional right to be protected from preventable diseases ; and State assistance is urgently required to safeguard the public by adequate hospital accommodations for advanced tuberculous cases, since, being often bed-ridden, their homes become infected and infectious foci of the disease, and promiscuous intercourse and spitting and dangerous crowding are permitted. Hence, sanatoria are conducive to the protection of a community as well as to the recovery of the individual. It certainly is most reasonable to utilize all possible means, including sanatorium influences, to suppress tuberculosis, which kills more persons than all other contagious diseases together, about which we do not hesitate to impose the most stringent regulations.

4. *Economy.*—State aid is needed on economic grounds, directly, to lessen the tremendous money loss to the poor dependents themselves in the characteristically long duration of the sickness itself, the expense incident to medical attendance, drugs and the special diet required for consumptives, and the considerable extra expenditure associated with the enormous mortality-rate. This expenditure is often a most distressing hardship because of the improvidence of many of the poor, and the fact that even in the pre-incipient stages of consumption many are not insurable, or are unable to pay for a life-insurance policy sufficient to relieve others in the family of a financial burden that they may be equally unable to bear.

Again, State aid in the treatment of the consumptive poor, in special hospitals and sanatoria, is needed to avoid the indirect loss to itself through various communities by the removal by death of thousands of persons who, if saved, would contribute to the general welfare and prosperity in improved and restored earning and productive capacities.

So, for selfish if not humanitarian reasons, the State should establish sanatoria for the treatment of the great army of curable consumptives.

To conclude: So tremendous and vital to the national health and welfare is this question concerning tuberculosis, the prevention of its spread and the reduction of its mortal ravages that, I desire to record my earnest and profound conviction that nearly, if not quite every State in the Union should have a tuberculosis bureau in its health or internal affairs department. Further, there should be in Washington, also, a tuberculosis bureau in a department of public health, presided over by a cabinet officer.

May the words of a resolution passed by the International Congress of Hygiene at Brussels, in 1897, speedily come to pass: "The hospitalization of tuberculosis is urgent, and will not long be withheld."

The Cost of Maintenance and Management of Hospitals and Sanatoria for the Treatment of Consumption.

BY THE REV. CHARLES A. DICKEY, D.D.,
PRESIDENT OF THE PRESBYTERIAN HOSPITAL, PHILADELPHIA.

[Read at the Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

I feel both complimented and embarrassed by an invitation to confer with distinguished physicians, regarding a matter so important as this one, which is being considered by a joint meeting of medical societies, and by those whom they have invited to take part in the discussion.

As an executive officer of a hospital I have tried to keep strictly within my own province, and to leave the settlement of medical questions to medical men. I would also venture to suggest that it contributes to good hospital management to leave the settlement of executive matters to those particularly charged with executive responsibility. Very naturally, physicians consider themselves capable of determining medical matters, without the interference of those who are responsible for maintenance and management, and, just as reasonably, I think, we may expect less friction, and better service, when lines are strictly drawn between management and medical direction. A connection of twenty-five years with hospital management leads me to express this judgment, and I have reason to believe that this opinion would be sustained by the staff of surgeons and physicians with whom I have been so agreeably associated. Therefore, considering this special propo-

sition to provide for the care and treatment of consumptives, whatever else may be determined, the success, in my judgment, will depend very much upon a careful distinction between management and medical direction.

The question of State or municipal support seriously complicates the matter. The city and State should make provision for this large, dependent class. Tuberculosis finds its victims chiefly among the poor. Poverty invites it—the conditions of the poor are its opportunities. This dread disease unfits its victims for work and casts them upon charity. There is no more helpless class in the community and public charity should protect the public by caring for these unfortunates. The whole community is concerned and the whole community should contribute by willing taxation. The difficulty is to get public money for support, without political intrigue and interference for control.

I have been asked to consider particularly the probable cost of maintenance. This will depend, of course, upon the general plans that may be adopted. If it should be determined to endeavor to establish district hospitals for the treatment and care of consumptives, there would be necessity for at least three in the State, east, west and central. The first cost of such plants would be very large. I cannot suggest figures, for there are so many contingencies to be considered. I would venture to say that we would have to think in millions to meet the cost of establishing such State hospitals for consumptives; and, when hospital buildings have been provided, the expense has just begun. Supposing that equipment is provided, it is not difficult to determine the cost of maintenance. By honest and economical management it should not, I think, cost more than from \$1 to \$1.25 per day—or say \$350 per year for each patient. In the hospital, with which I am connected, it costs about \$1.50 per day, including all expenditures. Our hospital is caring for a large number of surgical patients, and it costs more to meet the requirements of surgical cases than the requirements of medical cases. The boarding of patients does not represent more than one-fourth of the full cost of caring for them. In the case of consumptives, the cost of intelligent nurses would be, I think, the largest item. Good food; fresh air, that can be procured free in the country or by expensive machinery in the city; cleanliness, that can only be secured by intelligent oversight and continual labor; all these essentials would make the cost of maintenance as great, if not greater, than the cost of other hospital service.

Possibly it would not be so satisfactory, but surely it would be less expensive, and results could be more speedily obtained, if wards or

rooms for the care of consumptives could be established in connection with existing hospitals. Particularly in the case of patients, who have not reached the period of hopelessness. When the sufferer is beyond hope, a quiet country retreat will be best for both the patient and for the community. But when there is a fair chance for recovery, when skilful treatment gives any promise, there would seem to be an advantage in treating such patients in the best equipped hospitals. Much of the dread and opposition of the community would be avoided by making the treatment less conspicuous than can be done by erecting hospitals for the exclusive care of consumptives.

The public has been so impressed with the infectious character of consumption, that any attempt to locate a hospital in a favorable locality is likely to arouse fear and occasion positive protest. Such difficulties, as some experience suggests, may be thought less worthy of consideration than the advantages of treating consumptives in separate hospitals, located in the country. Possibly, a perfect system would embrace the treatment of such patients, both in separate wards or rooms of existing hospitals, and in sanatoria in the country.

For a considerable time, the subject of the possible treatment of consumptives in connection with the source of the Presbyterian Hospital, has been under consideration. A member of the board of trustees has expressed a willingness to erect a building in connection with one of our country homes. But the execution of this generous purpose, as yet, has been impossible, chiefly because our income will not allow the additional expense of maintenance. This same friend has offered to our board a tract of 130 acres, within forty miles of Philadelphia, which has been reported by Dr. Arnold, our resident chief, to be peculiarly adapted for the care and treatment of consumptives. There are good buildings on the ground which can be enlarged and fitted up at a probable cost of \$5000 and be made to accommodate from thirty to fifty patients. But, the serious question of maintenance confronts us and prevents immediate action. It would require an endowment of from \$100,000 to \$200,000 or an annual income of at least \$10,000 to make such a home or hospital free. I am not prepared to say whether it might be possible to make such a home or hospital, to any considerable extent, self-supporting.

In conclusion, I desire to express the positive conviction, that the merciful consideration of a large class of unfortunate sufferers, as well as the merciful consideration of the community at large, so much threatened by the neglect of consumptives, demand a prompt and vigorous effort to establish hospitals, or provide hospital treatment for

consumptives; and also to express the judgment that the best and quickest results could be gained, by bringing such influence to bear upon the existing hospitals, as might dispose and enable them to treat and care for consumptives.

Locations Suitable for the Treatment of Consumption in Sanitaria in Pennsylvania.

BY GUY HINSDALE, M.D.

[Read at a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

Granting that the treatment of consumption or tuberculosis of the lungs can best be carried out where the disease is least prevalent, where the air is purest and dryest, the soil dry and the skies clear and all the natural surroundings inspiring and attractive, what does Pennsylvania offer?

"I will lift up mine eyes unto the hills from whence cometh my help." That is the keynote of the successful treatment of the consumptive. Away from the smoke and dust and turmoil of cities! Away from the stifling heat of summer and the variable winters of the seaboard! Away from the daily contact of the thing—that little microscopic thing that reinfects and undermines the strongest lungs; that finds its entrance into the homes of rich and poor alike, and that is responsible for the death of an army of seven or eight thousand every year in our Commonwealth!

Of course, it is understood that all cities should have special hospitals for tuberculosis, especially for cases of an advanced stage. It would not be practicable or expedient to remove all cases of the disease to a distant point; but the State's expenditure ought to be made where the greatest climatic advantages exist and where the natural surroundings will conspire to give the best return for the investment by checking the disease, curing it if possible, and ultimately restoring the patient to his home and family and to usefulness in the community. Pennsylvania has such locations, and they have been recognized by the medical profession with advantage to their patients.

I wish to call attention particularly to three suitable localities in regions that I have personally investigated and that can be confidently recommended for institutions such as Pennsylvania needs.

1. The vicinity of White Haven, Glen Summit, and Bear Creek, in Luzerne County. These places are reached by the Lehigh Valley Rail-

road in about three and a half or four hours from Philadelphia, and afford elevations of from 1100 to 1800 feet. Glen Summit is well known as a summer resort, and on neighboring hillsides are some choice sites, with the purest water-supply and overlooking vast stretches of woodland. One of the most desirable sites is about a mile and a half southwest of White Haven, on the southern slope of Green Mountain. On this hillside there is a fairly level space well suited for the erection of buildings, with a southern exposure and protected from the northerly and northwesterly winds, the mountain ridge rising three or four hundred feet higher. The site has an elevation of about 1250 feet, and commands a fine view of the Lehigh Valley. There is a moderate growth of forest trees, principally oak, birch, and hemlock. The pine, unfortunately, has been cut away. A tract on this hillside of about four or five hundred acres would be donated by its public-spirited owner if it should be used for the purposes of a sanitarium. Considering its accessibilities to the large cities and its nearness to White Haven probably no better site could be obtained in this portion of the State.

2. The Pocono region. This is well known as a summer resort. It is a little higher than White Haven; a little cooler; the country is wilder and better timbered with evergreen trees. It is reached in four and a half or five hours from Philadelphia by the Pennsylvania Railroad and the Delaware, Lackawanna and Western Railroad. In the vicinity of Pocono and Tobyhanna there are desirable sites at elevations of 1800 to 2100 feet with fine prospects to the east and south. The Pocono plateau is the natural home of the pine and the hemlock; the soil is well drained, especially near the margins of the plateau, and the rhododendrons and laurel cover the hillsides. The climate is bracing, and there is a marked difference in temperature between noon and night, a quality that always characterizes elevated regions.

3. The vicinity of Kane, McKean County. This is in the northwestern portion of the State, on the great plateau of the Alleghanies, at an elevation of 2000 feet. It is a famous country for oil, gas, lumber, and good health. A small hospital already exists at Kane, and some tuberculous patients have been treated there, restored to health, and are pursuing profitable occupations in that region. Kane is the coldest, driest, wildest portion of the State. It is reached by the Philadelphia and Erie Railroad in about twelve hours from Philadelphia. The plateau is devoid of all but the smallest brooks, the timber is still standing in much of its primeval beauty; the light rainfall, absence of all hot weather, and the clear, cold winters make it one of the healthiest portions of the State.

As we follow this plateau southward we traverse the sparsely settled counties of Elk, Forest, Clarion, Indiana and Cambria, all having much the same climate, all well wooded, not much devoted to agriculture, maintaining a hardy, healthy population. Just as the Pennsylvania Railroad crosses the summit of the Alleghanies, where the water flows on one side to the Juniata, Susquehanna and Atlantic, and on the other side to the Ohio and the Mississippi, we find Cresson, well-known for its admirable climate and beautiful surroundings. On this broad mountain plateau there are no great valleys or towering peaks, but it is in itself a true summit, with forests for its protection, and it is a region where every prospect is offered for the relief and cure of a chronic disease like tuberculosis. There is a remarkably pure water-supply, and there is also a large modern structure with surrounding cottages capable of accommodating three or four hundred people and well adapted for sanitarium purposes should the State or private enterprise succeed in securing it for such a beneficent purpose.

Institutions such as the State should maintain ought to have provision for those who are able to pay a moderate amount for their treatment and accommodation, in order to lessen the burden occasioned by the care of those not so fortunately placed. This is done in our State hospitals for the insane. Furthermore, in choosing a site for hospitals for the treatment of tuberculosis due regard should be had not only to climatic advantages, good railroad accommodations and a pleasing prospect; but care should be taken not to antagonize the interests of surrounding property owners. Much of the success of any institution is due to the good-will of the neighbors, and it will be found that a well-conducted, scientific institution of the kind, we desire, will greatly enhance and not depreciate the value of property within a radius of many miles.

Especial Hospitals for Consumptives Among the Poor in Our Cities.

BY EDWARD O. OTIS, M.D.,
OF BOSTON.

[Read at a Joint Meeting of the Philadelphia County Medical Society and the Pennsylvania Society for the Prevention of Tuberculosis, January 10, 1900.]

“ Did any one have consumption in your family or where you lived ?”
I asked not long since in examining a patient at an institution for advanced cases of pulmonary tuberculosis. “ Yes, doctor, my wife died of it.” “ What would you have done if you had not been received

here?" I further questioned. "I suppose I should have gone to the poor-house," was the pathetic response.

In these replies of this unfortunate sufferer are presented, in brief, the principal reasons why in our large cities especial hospitals for poor consumptives, and particularly for the advanced cases, are desirable and a necessity, first, for prophylaxis—to prevent the well from becoming infected by the sick—for our patient undoubtedly contracted the disease from his wife; second, for philanthropic considerations, to offer an asylum with decent care to those cases which are incurable. We may call them the economic and the humane reasons.

But consumptive hospitals, I think, should mean something more than this. Hospitals they should be, and not asylums or homes, where those afflicted with this disease can comfortably die. They should afford as well curative treatment so far as the conditions of location in or near a city will allow. The arbitrary division of the disease into a curable and incurable class is by no means always possible. Many so-called incipient cases are hopeless from the first, while some in the advanced stages exhibit surprising arrests; therefore, I say, hospitals offering opportunities for treatment, and not "consumptive homes," ominously suggestive of Dante's lines: "Abandon hope, all ye who enter here."

Undoubtedly, the majority of the inmates in such hospitals would prove to be incurable, and, if they were all such, these institutions would a thousand times justify their existence from the stand-point of prevention and humanity; but, as in the German sanatoria, where all stages of the disease are represented, some would so improve or have their disease arrested as to be able to resume work again. In Dr. Turban's sanatorium, at Davos, in Switzerland, of those in the third or advanced stage 23.6 per cent. were absolutely or relatively cured, and 17 per cent. were found to remain so when communicated with from one to seven years after leaving the sanatorium. Of course, they had the advantage of the air of the Swiss altitudes; but, Philadelphia and Boston afford purer air than most of us utilize, and a goodly amount of sunshine.

It is hardly necessary to dwell upon the prevalence of pulmonary tuberculosis among the poor or the causes which produce it. They are quite evident to any one who is familiar with tenement-house life; unsanitary, insufficiently ventilated dwellings and workshops; deprivation of daylight and sunlight; insufficient and improperly cooked food; general ignorance of personal hygiene; the abuse of alcohol; monotony of life, etc., all tend to prepare the system for the germination of the

tubercle bacillus, and, on the other hand, the latter agent is always lurking in such abodes, as Dr. Flick has so admirably shown, and is ever being re-enforced through the ignorance, carelessness, and helplessness of the consumptive.

The fact, that tuberculosis is communicable, has so comparatively recently been established, that the public has hardly yet awakened to a realization of this truth. The interval of time between the infection and the development of the disease is so long that the cause is forgotten when the effect appears. With the other contagious diseases, the effect follows so closely upon the cause, that the connection between them is evident. Moreover, it has not been until recently that we have investigated the subject of exposure, the old belief of inheritance has been accepted as a sufficient and satisfactory explanation. One or two illustrations will perhaps make this matter of contagion more evident.

Last autumn a gentleman brought his son to me suffering from quite extensive pulmonary tuberculosis, and, on inquiry, I found that a servant afflicted with the same disease had been an inmate of the house for a year. This is not an infrequent cause, I believe, of the occurrence of tuberculosis in a household, the servant not realizing the danger to which she is exposing the family, and concealing her condition that she may retain her place. The following cases of consumption were thus exposed :

A dressmaker, whose two brothers and sister died of the disease, and she assisted in the care of the latter. A pantryman who was employed in a house where four men were ill with consumption, and he waited upon them from the pantry. A nurse who took care of a consumptive patient. A shop-girl whose mother and brother died of the disease, and she took care of the latter.

It is a common occurrence to find a consumptive wife who has contracted the disease by nursing a consumptive husband, or the reverse, and so one might continue citing cases, but enough has been said to indicate the danger of contagion and emphasize the extreme importance of consumptive hospitals for the purpose of isolation and prevention as well as of treatment.

In Boston in 1898 there were seventy-nine more deaths from pulmonary tuberculosis than from measles, scarlatina, diphtheria, croup, whooping-cough, typhoid fever, cerebro-spinal meningitis, cancer, and appendicitis combined. Of this number probably about two-thirds were among the poor, as they are always the greatest sufferers ; and all these deaths, let it be borne in mind, were caused by a communicable and consequently preventable disease. A generous and enlightened

public opinion has provided more than amply for its poor sick suffering from other diseases or from injuries, but the equally worthy poor consumptive is received as a rule into no institution except the almshouse, with a few insignificant exceptions.

For example, in Boston, the city has erected a veritable palace for its poor, suffering from all acute diseases and injuries, and the people rejoice in it. Private charity has established and endowed institutions for almost every conceivable form of need and suffering, the cripple, the aged, the little wanderer, and the orphan; a hospital and retreat for sick cats and dogs; a spiritual temple of rich and striking architecture where the poor can hold converse with ethereal messengers; a wealthy and flourishing church and organization for Christian science. Indeed, I do not know of anything in the way of a charity for which one cannot obtain money in Boston, and yet there has been standing vacant in this same city, for over a year, a new, well-equipped hospital of 110 beds, built especially for consumptives, with a long waiting list piteously begging for admission. Try as we will, we have not yet been able to obtain money enough to warrant its opening, and this is probably about the experience elsewhere. Why is the public so tender and liberal in behalf of every other kind of suffering and misfortune, and apparently so callous and indifferent toward the consumptive, whose suffering probably exceeds that of almost any other malady? The reasons for this attitude, I think, are several: the very prevalence of the disease and the consequent familiarity with it: the idea still largely held that consumption is incurable from the first, and nothing can avert the inevitable end (why, then, a hospital for it? Is it not preferable and natural that one should breathe his last at home among his friends?): finally, the slowness of its progress and the ability of its sufferers to keep about and exhibit to a degree the semblance of health until near the fatal *dénouement*, and, also, the ignorance, still common, of its communicability, and the danger from the dried sputum. That this point of view may be changed we must convince the public of the truth of the following propositions:

1. That consumption is the most prevalent and destructive disease existing to-day, causing a seventh of all the deaths, and is worse where human beings are crowded together—i. e., in the cities.
2. That it is communicable by the dried sputum, and hence, if this is not properly disposed of, there is danger to those constantly with the sick and to the public.
3. That it is very curable in the early stages and may be arrested in any stage, hence the importance of proper treatment and the need of

special hospitals and sanatoria where such treatment can best be instituted.

4. A certain proportion of consumptives will not safely dispose of the sputum, and should be transferred to a consumptive hospital for their own protection and that of the public.

5. Many cases of consumption appointed to die—the hopeless ones among the poor—have no decent place or care, and must either die in abject neglect or go to the almshouse. For this large class, consumptive hospitals are most urgently needed. The condition in which some of these dying consumptives are found is pitiable in the extreme.

One or two illustrations from personal experience and that of the institution with which I am connected :

A consumptive husband sleeping on the kitchen floor ; a young man far advanced in the disease found in a stable ; a husband, wife, and child living in one room, the former a consumptive, sleeping on chairs ; a consumptive baker, homeless, and sleeping in various bake shops of his friends. What an excellent method of disseminating dried sputum ! A servant with extensive disease in a wealthy family, and concealing her condition in order to retain her position, not an infrequent occurrence, and a constant menace, of course, to the household.

An average working man with a family, or a working woman, can earn but little more than their daily needs, and though they manage to get through a short illness the outlook for them is utterly hopeless when confronted with a long, lingering illness like consumption.

When the public vividly realizes the above facts they will demand municipal and State aid in the care of the consumptive and for the protection of the community, and ask that a portion of the private beneficences be applied to this object. How shall we arouse the people to this point of action ? The medical profession has been endeavoring to accomplish this for a number of years with scant success, but the physician regarding matters of prophylaxis and sanitation labors under very much the same disadvantages, it seems to me, that the clergyman, for example, does regarding religious and ethical questions. “ It is the business of the latter,” one says, “ to preach upon these themes,” and, from this very fact, one is less profoundly moved by his message. Likewise when the physician preaches preventive medicine “ it is his business,” one says, and passes on unmoved.

I would suggest that the physician should become the power behind the throne, and let the laymen take the initiative in this crusade against consumption. Make it a popular movement, a fashionable one, if you will ; use all legitimate methods to attract the public and impress upon

them the terrible prevalence of consumption and the remedy. Let an association like the admirable and almost solitary one in this country, before which I have the honor to speak, increase to the utmost its membership; hold frequent meetings with laymen of note and influence as speakers; form sections and local societies in various parts of the State; enlist the daily press; have the meetings widely reported, and let frequent articles appear upon the necessity of consumptive hospitals as a protection to the people. In brief, use for this righteous and urgent need in the community the methods the public-minded citizen uses to accomplish a worthy object or to oppose a base one. This is not Utopian; it has been and is being done in England, Germany, and elsewhere. The Prince of Wales made the Marlborough House meeting for the prevention of tuberculosis popular and fashionable, and the Empress of Germany is at the head of a similar movement in that country.

In England the daily press was enlisted in the cause and aroused the interest and enthusiasm of the people. Local societies sprang up all over the country, and money was contributed for prevention and the erection of sanatoria for the open-air treatment, and the work is now in full progress, largely due to laymen and the daily press, though, of course, the patient physician has been all the time the power behind the throne, content to see the result achieved and let others have the praise.

When once the public is awakened to the necessity and urgency of consumptive hospitals it will quickly respond. The fearful will act from motives of self-protection, and the philanthropist from humane ones.

Besides the establishment of consumptive hospitals in the city or its near environs for *all* cases of consumption, but particularly for the advanced cases, for which I am now especially pleading, I believe that there should be several sanatoria in the State more favorably situated climatically for the application of the open-air treatment, and not too far distant from the city. From the city consumptive hospitals the more hopeful cases can be later sent to such institutions. This is very much like the plan pursued in the London consumptive hospitals. Several consumptive hospitals will be required in a city like Philadelphia, in my opinion, and, as with all new movements, the struggle will come in obtaining the first one. Once its value and beneficent work is recognized the others will more readily follow. In the meantime, the expediency of setting apart wards in some of the general hospitals for the exclusive occupancy of consumptives is to be considered, as has been determined upon in some of the Paris hospitals. As to the ex-

pense of such hospitals, it will probably be about the same or perhaps a little less per patient than in our general ones. At the small institution of twenty-eight or thirty beds with which I am connected it is about seven dollars a week ; at the State Hospital at Rutland it is about eight.

The consumptive hospitals in London are supported by voluntary contributions. With us in Boston, our great city hospital with its extensive and elaborate department for contagious diseases is supported by municipal appropriations. Nearly all our other charitable institutions for the sick and unfortunate are sustained by private contributions and legacies.

If it is the duty of the city, as most cities so consider it, to provide for the care and treatment of its injured, and sick poor suffering from other diseases, it is equally its duty to provide for the equally worthy poor consumptive. It is his misfortune to have this fearful disease, not his crime or personal election. He sees a neighbor with appendicitis taken to a perfectly appointed hospital and operated upon by the most skilful surgeon, or another with pneumonia receiving like perfect care and skill ; but for him the city neither will nor ought to open the doors of its general hospitals, and he must either drag out his life in wretchedness, losing his chance of cure or arrest by proper treatment, or as a last resort go to the almshouse. And, further, there is the added reason why he should be provided for, because his disease is a communicable one and he is endangering others.

The State and city do have to provide ultimately for many of their poor consumptives in their almshouses and other institutions, and the expense is probably as great, at least, as it would be in the proposed consumptive hospitals, which not only offer an asylum but treatment and many other advantages. The outlay, then, would by no means be an entirely new and extra one, but only in another and more economic direction. Further, by reducing the number of consumptives by this enlightened method—as the London consumptive hospitals have proved is the case—there would result a yearly saving of lives whose labor has a money value to the community. As I have elsewhere said,¹ “ I believe that the expense of establishing especial hospitals for this disease would be more than compensated for by this preservation of lives with years of service before them, and the added saving of the expense now incurred by the State and city in the care of the neglected consumptive,” and I may add largely wasted by the unintelligent method now pursued.

¹ “ The Struggle Against Tuberculosis,” Boston Medical and Surgical Journal, Sept. 21, 1899.

One point more, in conclusion, which seems to me relevant to my subject. How shall we get at all the cases for which isolation in a consumptive hospital is desirable from the stand-point of danger to the immediate household and community? While I have no doubt, from my own experience, that the voluntary applications will more than fill a number of such proposed hospitals, there will be some, who from ignorance and mistaken views, will prefer to remain in their own unsanitary surroundings and will not properly dispose of their sputum. I see but one way by which this can be accomplished, namely, to make consumption a notification disease as with the other contagious maladies. I am familiar with the arguments against this, that it will stamp the consumptive as a leper and add to his suffering, already hard enough to endure. Most of these objections, it seems to me, are largely chimerical. Notification simply gives us the means and the only sure ones of knowing where the consumptives are, and in case of doubt permits us to adopt such measures as will protect them against themselves and afford, as well, protection to their friends and the community. To remove a consumptive from a wretched abode to the care and comfort of a hospital is a mercy to him, even if it is done contrary to his ignorant will and that of his friends.

I feel morally certain that the public will become aroused sooner or later and apply itself with eagerness to the solution of this problem. Very likely they may overdo it in some directions in their fear of the disease, but better this than an inactive indifference. We shall see before many years, I feel sure, consumptive hospitals arising in all our cities and the large present appalling mortality from this preventable disease rapidly and steadily diminishing. I do not mean to be understood as conveying the idea that consumptive hospitals are all that is needed to stamp out the disease. Better sanitation and personal hygiene, a deeper realization of the dangers of impure air, and the lack of light and sunshine and all that makes for wholesome living are allies in the struggle.

How soon this devoutly desired consummation shall be accomplished will depend largely upon the exertions and persistence of such societies as are represented here to-night, upon whom the morning light has already broken, and who are keenly alive to the awful ravages of this *curable* and preventable disease.

DISCUSSION.

DR. J. M. DA COSTA said he came to the meeting as a listener, and to show by his presence his deep interest in the subject.

Everything that could be said had been well said on this occasion. Not one of the papers read, if published broadcast throughout the world, but would tend to cause the saving of human life, and the amelioration of human suffering. If he were to choose the part of the subject, as it had been presented which had interested him most and about which he felt the deepest interest, it would be the statements regarding the utter insufficiency of ordinary means to combat the disease and to solve the great questions involved. He was entirely in sympathy with the gentleman who said the matter was one much too large for individual effort, and that the State must take it up if anything is to be accomplished. Indeed, unless many of the immensely rich would give up their fortunes to it, it would be impossible by individual effort alone to obtain means to be of sufficient avail. All that individuals can do is but a drop of relief in an ocean of woe.

One or two other points connected with this great subject appealed to him very much. The more frequently individual hygiene is mentioned, the more it is impressed that sunlight and sunshine and pure air and pure water and personal cleanliness have a great deal to do with lessening the mortality and power of infection by giving greater resistance to the individual; the more this is promulgated, the better for the community. Although the time has come for decided action, something may still be done even by talk. Talk is not without value. By talk and wide publicity it may be impressed on the people that they have the power to add to their own resistance, and thus lessen the tendency to contract the disease.

Another thought, perhaps not adequately treated, is the one that the discovery of Koch, great as it is, has been a most baneful one to the poor consumptive. When there was yet doubt as to the contagiousness of the disease he was admitted to the hospitals: now, he is a contagious case and is debarred. So that, all the discoveries in science as to the origin and contagiousness of tuberculosis have really added to the hardship of the individual. Therefore, it becomes doubly a duty of the community that as fuller knowledge has shown consumption to be a source of danger to all, and makes it more difficult for the consumptive poor to be cared for, the community should come to the rescue and do something for one to whom it now more strictly and peremptorily than formerly refuses aid in our hospitals and public institutions.

MAJOR W. J. LAMBERT expressed his interest in the subject and his hearty sympathy with the speakers who said that all the hospitals were closed to the consumptive patients, and particularly so since science had developed that it was a contagious disease. That the hospitals are closed is true with at least one exception, that of the hospital over which he had once the honor to preside. While there is competition for every class of cases, and the am-

balances are solicitous for their respective hospitals, yet, when it comes to cases of consumption, the Philadelphia Hospital—the Almshouse—has no rivalry.

The ideal is often unattainable, but it is to the credit of the Philadelphia Hospital with its present surroundings, occupying buildings which have been used as such for more than sixty or seventy years, to have kept so well in advance in scientific matters. Whilst it has been unable to secure isolation, it has provided separate wards for its consumptive patients, and has done all that can be done in the way of providing them better treatment and securing for the other inhabitants in the institution isolation from this disease.

As a layman, realizing the difficulty of securing large appropriations of money for every needed purpose, he agreed with the suggestions in the paper of Dr. Dickey, that the best use be made of the facilities at disposal now, and until that happy day shall come when in regions especially adapted for the treatment of consumption, sanatoria shall be established. He believed that the hands of the local municipal authorities should be upheld, that the Board of Charities and Correction with its able corps of surgeons and physicians should be encouraged to do the good work they are now doing—and, not to wait until better conditions are presented making it easy and desirable, but to take the institution as it is found for the benefit of the consumptive who comes to the doors of that hospital, which must every day open, however closed may be those of other institutions.

DR. J. EDWARD STUBBERT'S invitation to this meeting, he said, caused him to realize that while in New York the attempt had been made to establish a society for the prevention of tuberculosis, no meeting had yet been held, and, therefore, in this matter, even on the talking basis, Philadelphia is ahead of New York.

Action is valuable, but talking must precede action. This was strongly impressed upon him last year when a number of physicians appeared before the New York Legislature to show them the advisability of making, not only appropriations, but large appropriations, for the care of the tuberculous in the State. It was so positively demonstrated that this was a public necessity, and that it was also a public investment, that if the representatives at the Capital had been sure of public opinion at home every cent asked for would have been voted. As it was, all had to go home and ask their constituents what they should do about the matter. At the present time in New York the matter is being publicly discussed, so that there shall be no question about the sentiment of the people. State hospitals for the care of the tuberculous patients are a necessity. Some four years ago a ladies' meeting was held in New York, and one of their number took up nearly the whole time of the meeting telling about a consumptive girl, whose family had attempted to gain admission for her to seven different State hospitals, without success. There was not much sewing done at that ladies' meeting, but they talked and talked, and action followed their talk, and the result was, that within a week of that meeting a hospital was established in New York State that opened its doors to the indigent consumptive. Although from

month to month it is a question where the funds are coming from, the Loomis Hospital has been running successfully ever since its institution, and he thought that an average of twenty to thirty patients were cared for there constantly. This movement suggested to these same ladies the necessity of establishing a place outside the city limits for such incipient cases as hold out some hope of recovery, and the result was the establishment of the Loomis Sanatorium at Liberty, already referred to by the Chairman. It is, however, not for the poor people, but for curable cases among those in moderate circumstances. This was only mentioned to prove the statement that the ideas of the public, following those of the profession, have changed regarding the curability of this disease. It was recalled by Dr. Stubbart that in the hospital in which, shortly after graduating, he served as an interne, there was a ward for consumptives, and no idea was entertained concerning them but that of making them comfortable. It has been thoroughly demonstrated in many sanatoria, that a large percentage can be returned to their homes. Not that a large percentage can be cured, but at least 20 per cent. can be cured, and 10 per cent. more can have the disease arrested, which is practically the same. If three classes of cases are taken—those cured, those arrested, and those who can have their condition sufficiently improved to return to their former homes—it will be found that they average 71 per cent. or 72 per cent. With these statistics before them, it is the duty of the State and of the laity to take up the financial and administrative side of the matter, and provide the necessary means for granting this boon to the large number of the public who are suffering from this disease.

The question of cost, as referred to city hospitals, was felt by Dr. Stubbart to be out of the province of this discussion, but he referred to it for the following reason: Cases must be divided into two classes—sanatorium cases and hospital cases. The city cases, again, can be divided into two classes—those in hospitals and those fit subjects for homes; that is, a place where they can be taken and where they will be allowed to die in peace. The moment one goes beyond that, and attempts to cure cases, there is added expense in the appliance of every means of science; the cost will increase out of all proportion, and, finally, the sanatorium is a far more expensive problem. When the time comes, in Pennsylvania, as it is coming in New York, for the voters at home to instruct the law-makers to provide such sanatoria, they should be instructed to vote an amount of money sufficient to carry on the work to a successful issue. Conducted on the financial basis applicable to retreats, insane asylums, and general hospitals, sanatoria for consumptives would be nothing more than disappointing failures.

MR. WILLIAM B. HACKENBURG expressed his pleasure at hearing that the theory regarding consumption to be hereditary and incurable has been completely dispelled.

The Jewish Hospital has never closed its doors to consumptive patients. Until the organization of the "Retreat" ten years ago, the title "Incurable Ward" being dropped, patients were admitted to its general wards. From 1888 to 1898 inclusive the hospital records show that an average of 55 con-

sumptive patients have been treated per year, with a minimum of 12 cases in 1891 and a maximum of 104 in 1897.

The Montefiore Home in New York has 285 free beds for the treatment of consumption and allied diseases, and the Jewish Hospital in Denver, Colorado, has 50 to 75 beds for the treatment of consumptive patients exclusively. These cases were cited to show that erroneous statements had been made and that the Jewish Hospital is one of the hospitals in Philadelphia that has always been open for the care and treatment of consumptive patients. The Lucien Moss Home, founded by the late Mr. Moss, with a bequest of \$50,000 for a building and about \$150,000 for maintenance, is now nearing completion, and is destined for the treatment of incurables of the Jewish faith.

While the aid of the State should be invoked and may at some time be secured, it is one of the hardest things possible to obtain. Judge Ashman has ably stated that point. Possibly with proper influence, in due season, aid may be secured. It is very desirable to establish institutions in this and other large cities for the treatment of the poor afflicted with tuberculosis and efforts to secure State aid should not be relaxed.

The statement by one of the speakers that \$350 per year for each patient would support a hospital for consumptives is erroneous. Hospitals of this character, for various well-known causes, are much more expensive to maintain than general hospitals; the Jewish Hospital cost last year \$1.05 per day, the expenditure has been as low as 89 cents per day; but it is not safe to estimate the expense for a hospital for consumptives at less than \$400 to \$500 per annum for each patient; the Jewish Hospital Association calculate about \$8000 to be the cost per annum for incurable wards containing sixteen to twenty patients.

A Case of Tetanus Treated by Subdural Injections of Anti-toxin, and Hypodermic Injections of Carbolic Acid.

BY ERNEST LAPLACE, M.D.

[Read January 24, 1900.]

S. M., aged thirty-two years, a native of Turkey, ran a rusty nail in the sole of his right foot on November 4, 1899. The wound was allowed to heal; which took place without difficulty. On November 14th, he felt a headache, difficulty in deglutition and pain in the back. He entered the Medico-Chirurgical Hospital on November 17th, two and a half days after the appearance of symptoms. There was complete trismus, difficulty of deglutition and pain in the back. His temperature was 99.3°, his pulse 76, and his respiration 20.

The next day, that is on the fifth day of the disease, the patient, previously anæsthetized, was trephined, on the left side a little posterior to the motor area, and 20 c.c. of antitetanic serum were injected slowly

under the dura. The scalp was temporarily sutured. The patient showed no perceptible reaction from the subdural injection. The temperature rose from 98° to 100°, but quickly returned to normal on the next day, the pulse was 84, the respiration 30. There was no headache. The trismus did not change.

Two days after the first injection, the scalp wound was opened, and 40 c.c. of antitetanic serum were injected slowly under the dura, without anesthetizing the patient. He complained of no pain during the injection. In two hours, his temperature had risen from 98° to 101.3°, his pulse was 102, and his respiration 24. He complained of a slight headache. In the course of a few hours, he complained of a numbness of the right side of the body, with difficulty of motion, but no paralysis. This persisted two days, and these were the sole symptoms traceable to cerebral irritation from the injection of the antitoxin. The patient was fed on liquids, through a medicine dropper, so tightly were the jaws set. Twenty-four hours after the second injection of antitoxin, opisthotonos set in. The spasms at first mild, became more severe and lasted from five to fifteen minutes at a time. They began on the eighth day of the disease. They were so violent as to result in marked cyanosis and necessitated the administration of chloroform to produce relaxation. The attacks recurred every half hour. On the ninth day the spasms became milder and recurred at greater intervals.

We now began the injection hypodermically of five drops of pure carbolic acid in ten drops of water every three hours. On the tenth and eleventh days the symptoms continued milder, there being now but sudden tremors lasting ten or fifteen seconds, instead of the regular attacks of violent opisthotonos.

On the thirteenth day of the disease, the jaws relaxed, to the extent of one-fourth of an inch. The relaxation increased gradually afterward. The carbolic acid injections were continued during six days, making a total of forty-eight doses of five drops each. The temperature remained about normal, though it often sank to 98° or even 97.5° after the carbolic acid injections. The symptoms gradually disappeared, the patient being able to swallow without difficulty.

On the sixth day of the disease, the area where the puncture had taken place, was excised while the patient was still under ether, and the wound thoroughly cauterized with carbolic acid. On the twenty-first day of the disease the patient sat up and walked about.

The urine was normal throughout the treatment.

Although, by reason of the first symptoms of tetanus manifesting themselves ten days after the injury, the case cannot be classed among

the most acute forms of the disease, still it approaches very near that class, and therefore the prognosis was unfavorable.

Following Roux's suggestion, I determined to inject the antitoxin, directly under the dura, for in my three last cases of tetanus I had failed after injecting as much as 360 c.c. of this same antitoxin in the subcutaneous cellular tissue; furthermore, the subcutaneous injections, in the hands of others, had likewise so often failed, as to further tempt me in trying the subdural method. Kocher and others have used the direct injection of antitoxin in the lateral ventricles. But this procedure, I take it, is too risky especially if large amounts of antitoxin are to be injected. The cases reported by Kocher only received 5 c.c. at a dose in each lateral ventricle, whereas our case received 20 c.c. at the first dose and 40 at the second dose. I believe that the subdural injection meets the same object as the intraventricular injection with less risk of traumatism or hemorrhage.

Kocher drills a small hole in the skull, and introduces a long needle blindly in the direction of the ventricle. In the subdural injection the fluid spreads over the surface of the brain, and as we found, produced no permanent after-effects. I judge that it must have rapidly mixed with the cerebro-spinal fluid, which carried it to various portions of the brain and spinal cord, for direct local absorption and action. It will be noticed that the symptoms were rather aggravated than improved after the injection of the antitoxin. This, I believe can be explained. The antitoxin, acts not as an immediate antidote, but requires time for thorough absorption and assimilation before it gradually alters the nature of the soil upon which the tetanus bacillus grows. There has been no positive proof, yet, that even in a fatal case of tetanus, the bacillus exists in the blood or in the nervous system. It would seem therefore, that the spasms characteristic of the disease are the result of the local action on the nervous centres of a toxin of intense violence generated by the developing germs at the seat of the injury, and gradually absorbed by the circulation.

Having heard of the reported good effects of carbolic injections I determined to combine it here with the antitoxin injections. I have no further apology to make except, that having invariably seen death as the result of all the cases presenting the violent symptoms of our patient, I felt there would be not undue risk in combining the two treatments. I have since inquired for a sufficient explanation, why subdural or intracellular injections of antitoxin should be followed by better results than the subcutaneous injection. The following theoretical reason offers itself, and I present it under all reserve.

The tetanus bacillus is essentially anaërobic ; it develops in the depths of the tissues. Its toxin is therefore the result of an anaërobic process. The antitoxin is the serum of a horse made immune to tetanus by increasing doses of tetanus cultures and is, therefore, charged with anaërobic material. Now, the part of the patient's body to be acted on is his brain and spinal cord. When the antitoxin is injected under the skin, it is absorbed by the veins and going to the right heart is fully aërated and oxygenized in the lung, a condition which possibly alters the anaërobic nature of the antitoxin. On the other hand the direct subdural or cerebral injection, allows of immediate action locally on the brain and spinal cord, before the circulation could take it to the lungs.

From the above case we learn :

That a severe case of tetanus (ten days' incubation) has recovered after the subdural injection of 60 c.c. of antitoxic serum, prepared in the Pasteur laboratory of Paris. The focus of infection was removed on the sixth day of the disease.

2. That the treatment was combined with hypodermic injections of five drops of carbolic acid in fifteen drops of water, every three hours until forty-eight doses had been administered.

3. That no untoward brain symptoms permanently followed, the subdural injections of this comparatively large amount of fluid.

4. All symptoms of tetanus had disappeared on the twenty-first day of the disease.

EXHIBITION OF THE PATIENT.

The sole of the foot presents a scar showing where I removed the part punctured, and there is also a scar on the skull, part of which wound healed by granulation. I kept the part open for about eight days, not being sure of the result of such heavy doses of antitoxin. Otherwise, the man is well. His mind is perfectly clear and he now does heavy work in a stable.

The temperature-chart shows only two rises which followed the injection of antitoxin under the dura. Subnormal temperature followed an hour or so, after the injection of the carbolic acid. The chart shows nothing remarkable, except that, throughout, the pulse never rose above 100, which it reached after the subdural injection ; at other times it remained about 80. An interesting fact is that the injection of carbolic acid was not followed by the appearance of a trace of albumin in the urine, as is the common occurrence.

DISCUSSION.

DR. LAPLACE asked whether Dr. Kelly knew the result of the latest researches in the pathology of tetanus, and whether the bacillus had been found in the surface tissue of the brain and spinal cord.

DR. A. O. J. KELLY, in reply to the question of Dr. Laplace, said he had no knowledge of the subject. He added that it appeared from the report of the case by Dr. Laplace, that the good effects of the treatment did not become apparent until the use of carbolic acid had commenced. In view of this fact, and also from his knowledge of reported beneficial effects of the use of injections of carbolic acid in the treatment of tetanus, he was inclined, in great measure, to attribute the happy outcome of the case to the use of carbolic acid. Stating further that it is easier to criticise than to advance new ideas, he said that he had gathered from the remarks of Dr. Laplace that the latter attributed the activity of the subdural injection of the tetanus antitoxin (as contrasted with its relative inefficiency when injected beneath the skin), to the fact that the tetanus bacterium is anaërobic and produces its toxin as also its antitoxin anaërobically—that is, in the connective tissues of the animal. Injected beneath the skin it immediately reaches the lungs where its activity may be compromised by the contained oxygen; injected beneath the dura, it exerts its activity before it can have reached the lungs. In criticism of this supposition, he offered the suggestion that there is quite as much opportunity for the antitoxin to become altered in the lungs of the animal producing it, as there is for the same to occur in the lungs of the patient to whom it may be given subcutaneously. With the exception of two, all the cases of tetanus seen by Dr. Kelly had been of such severity that they resulted fatally. The two exceptional cases had become chronic; one patient had ultimately recovered, whereas the other had become insane.

DR. ERNEST LAPLACE, in closing the discussion, said he agreed perfectly with Dr. Kelly that the improvement in the patient began after the use of carbolic acid was commenced. Although sufficient of the antitoxin to ultimately get the right results had been injected, the patient's condition, by reason of repeated attacks of spasm, had become so critical, that, knowing there were authentic cases of benefit resulting from treatment by carbolic acid, he determined to use it. As a scientific observation, it is not clear how much credit to give either agent.

In answer to the second and just criticism of Dr. Kelly, it was stated by Dr. Laplace that antitoxin, as it circulates through the horse's blood is by that time comparatively physiological to that horse. It is not supposed to be a sick horse, but an immune horse. He is accustomed to this toxin poison, so it can be imagined that it may circulate without being altered; but, put this antitoxin into another body, surcharged by tetanus poison it is apparent in that the condition is somewhat different. This theory has no precise value, and may be open to objections.

DR. J. H. MUSSER said that in the case to which he had already referred, the combined use of carbolic acid and the hypodermic injection of antitoxin

were employed. He had no doubt but that the subdural method employed by Dr. Laplace is necessary for the success of the antitoxin.

DR. LAPLACE wished to emphasize the expression of his opinion that the subdural method was superior to the intracerebral, which involves the piercing of the brain and which has been adopted by Dr. Kocher. Inasmuch as the same results can be achieved by the subdural operation and without as much risk, it is preferred by Dr. Laplace.

DR. J. H. MUSSEY regretted very much that he had to report a case which resulted fatally in spite of the use of antitoxin by hypodermatic injection, but not by the subdural method.

A Brief Account of a Few Surgical Cases of Unusual Interest.

BY ORVILLE HORWITZ, B.S., M.D.

[Read January 24, 1900.]

Cases are constantly met in the practice of the surgeon that present complications which, when brought to the notice of the profession, may prove acceptable as possessing unusual interest. The knowledge to be gained from the recounting of such experiences is instructive, and may serve to guide the physician as to the method to be pursued in similar cases.

CASE I. AN UNEXPLAINABLE CONGESTION AND ENLARGEMENT OF THE LEFT ARM CURED BY AN EXPLORATORY OPERATION.

The remarkable case about to be recounted is one of unusual interest. It presented all the symptoms of obstruction from pressure or partial occlusion of the subclavian or the axillary vein. An exploratory operation revealed nothing; nevertheless, the individual made a permanent recovery and has enjoyed perfect health ever since. The following is a statement of the case:

The family history is negative. The patient had had the usual diseases of childhood; was affected in early life with malaria, accompanied by hæmaturia; contracted syphilis at the age of twenty-one years, for which he was under treatment for some months; has had no symptoms of the disease since; is married, and his children are healthy. The present trouble began in June, 1897. It was attributed to a slight heat-stroke. Four nights after this event he was awakened with a sensation of tingling and numbness of the left arm, as though it were "asleep." After rubbing the limb the feeling passed away. These attacks were repeated every night or so, gradually grew more severe, and were always relieved by traction and friction.

This condition lasted about the space of a month, when, on a certain

day while using the limb, he was seized with an attack of numbness. The entire left arm from the scapula to the fingers became cyanosed and enormously swollen, this was accompanied by sharp pain about the middle of the forearm. The attack lasted about one hour, when the hand and arm returned to their normal condition.

This was followed by a petechial eruption of the whole arm, which persisted for some time. The attacks gradually became more frequent until they reached as high as twenty or thirty in a day, being produced apparently by any trivial movement of the arm. They seemingly occurred at night without arousing the individual, as was evidenced in the morning by the swollen and discolored condition of the arm and hand. Synchronously with the arm seizures there was a peculiar knotted and distended condition of the external jugular vein, which disappeared as the paroxysm passed off. For two weeks prior to presenting himself for treatment the swelling of the vein had become permanent and the lancinating pain had changed to one of a constant burning character, associated with a feeling of numbness. "The arm had a heavy, dead feeling." The patient stated that by elevating and extending the arm, making traction forward, upward, and outward, to a moderate degree, the phenomena quickly subsided. On examination of the left arm, it was observed that the skin was smoother than that of the one on the opposite side; it showed no sign of any eruption; the hand and wrist were of a peculiar dusky hue, smooth, and somewhat glazed. Impression made by the finger produced a momentary whitening, which quickly disappeared, discoloration returning; there was slight pitting on pressure; below the elbow the skin had a cool feeling, more marked as the examiner's hand passed toward the extremity. There was no evidence of muscular atrophy or loss of power; the whole arm was greatly swollen. On flexing the fingers, complaint was made of stiffness in the tendons and a painful sensation was experienced, which extended to the clavicle. No evidence of tumor could be detected in the region of the clavicle or axilla; the external jugular vein was found to be enlarged, firm, and tortuous, the overlying tissues being tender to the touch.

The heart, lungs, and kidneys were normal. On attempting to remove his shirt, an attack was suddenly produced. The arm became of a livid hue, of a dark reddish tinge, extending as far as the scapula, the swelling being greater of the arm and forearm than of the hand. The patient described the arm as being the site of a burning, tingling feeling; the external jugular vein was found to be very tense and knotted. The radial vein stood out full and prominent along its whole length.

The pulse was normal. During the attack muscular action was unimpaired. On flexing the fingers, severe pain was produced. The symptoms disappeared as suddenly as they came. Previous to his first visit to me the patient states that he had been treated with iodide of potash ; various preparations of mercury, bromides, nitroglycerin, belladonna, strychnin, and thyroid extract, without any benefit. Several prominent physicians who had seen the case had made a diagnosis of "Raynaud's disease."

As it was presumed that some obstruction of the subclavian or axillary vein existed, an exploratory operation was advised. A consultation was held with Dr. W. W. Keen and Dr. F. X. Dercum, who agreed that this would be the best course to pursue.

The patient was prepared in the usual manner and the subclavian artery and vein were both exposed. The superficial veins were found to be engorged and tortuous, and they bled freely when incised. The subclavian and internal jugular veins were found to be very much distended, but as no cause for the condition could be detected it was decided to explore the axilla. The axillary vein was in a similar condition to that of the subclavian. There was nothing abnormal nor anything to account for the symptoms from which the patient suffered. The wound was closed. The patient made a rapid convalescence. He began immediately to improve, and in the course of a few weeks all his symptoms had completely disappeared ; he was able to resume his usual occupation and has not had any trouble since. A letter received from him a few days ago states he still enjoys perfect health.

A case similar to this was reported by Osler in the *Journal of Nervous and Mental Disease*, 1888, vol. xv., in which a patient, in almost a precisely similar condition, was admitted to the wards of the University Hospital, and was placed upon medical treatment without benefit, no operation having been attempted. In the report of this case Dr. Osler stated :

"The condition was one of faulty innervation of the vessels of the arm during exercise, and defect in the local, regulating mechanism controlling the supply and outflow of the blood, the circulation of which is, as we know, enormously increased by contraction of the muscles."

CASE II. SPLENECTOMY.

Although this operation has been performed many times with success since the report of the first authentic case, by Quittobaum, in 1826, it still remains one of great interest to the surgeon ; not only on

account of the danger from shock at the time of the operation, but from the liability to death from subsequent hemorrhage. It is only by reporting the results of operations that reliable statistics can be gathered. It is generally conceded that the causes for removal of the spleen should be limited to tumors, cysts, wounds, and movable spleen; especially is this operation necessary when the pedicle of the spleen becomes twisted and gangrene of the organ is threatened. In cases where there is *leucocythæmia*, *splenomegaly*, or *lardaceous spleen*, an operation should not be attempted. Removal of *hypertrophied spleen* is not usually successful; should the enlargement be due to *leukæmia*, an operation should not be thought of. Splenectomy is almost always followed by death from hemorrhage if the individual be affected with leukæmia. In the *Journal of the American Medical Association* for April, 1896, Douglas gives the following interesting statistics:

Simple hypertrophy of spleen	.	.	.	59 operations, 25 deaths.
Neoplasms	.	.	.	5 " 3 "
Hydatids	.	.	.	6 " 2 "
Wounds	.	.	.	43 " 11 "
Leucocythæmia	.	.	.	36 " 31 "

Out of 117 cases collected by Vulpinus there was a mortality of 50 per cent.; 32 of these cases were unsuitable for operation, leaving 85 cases in which the spleen should have been removed, giving a mortality of 33 per cent. (*American Text-book of Surgery*.)

In an article which appeared in *The Medical News* of 1898, Dr. Frank Hartley gives the following statistics: "17 cases, malarial enlargement, spleen, mortality, 13.5 per cent.; 30 cases, idiopathic hypertrophy, spleen, mortality, 22.1 per cent.; 22 cases, wandering spleen, mortality, 8.7 per cent.; 9 cases, echinococcus cysts, with 2 deaths, mortality, 22.2 per cent.; 4 cases axial rotation, mortality, 25 per cent.

"Sarcoma of the spleen: Six cases have been reported, in three there was recovery from operation, but subsequent death from recurrence. In one case death occurred immediately after operation; in two cases in which the sarcoma was small the patients are still alive. To summarize: One patient lived two years after operation and one patient for one year (33.3 per cent.); three patients died from recurrence (50 per cent.); one patient (16.66 per cent.) died immediately after the operation.

"Three cases of chronic congestion of spleen and amyloid kidney; three deaths. One case of syphilitic spleen; one death. Six cases of ruptured healthy spleen; mortality, 50 per cent."

The history of the case to which I wish to call your attention is briefly as follows:

Mrs. M. S., aged thirty-five, married for twelve years, was never pregnant; gave no venereal history, and had had the usual diseases of childhood. Her family history was negative. At her first visit she stated that she had been more or less of an invalid for the past four years; that she had lost strength and flesh; that she suffered from constant pain and weight in the left side, and that she was unable to be on her feet for more than an hour or two during the day. She was pale, anæmic, emaciated, and suffered somewhat from dyspepsia and constipation. She had been examined by several physicians, who told her she was suffering from tumor of the kidney. On examination the abdomen was found to be markedly distended by a large abdominal growth; especially was this the case on the left side, the enlargement extending from the border of the ribs to the crest of the ileum, reaching nearly to the median line. It was dull on percussion, but not tender to the touch. An examination of the blood and urine gave negative results; the urine was obtained directly from the right and left kidney by catheterization of the ureter. The diagnosis was made of hypertrophy of the spleen, and as the patient was rapidly losing ground and suffering constant pain, an operation was advised, care being taken to fully explain the danger attending the procedure.

An incision was made along the linea semilunaris, extending from the border of the ribs to the crest of the ileum. On opening the abdominal cavity, the spleen was found to be adherent to all the surrounding viscera, and as more room was required, a second incision was made, from the middle of the first, backward toward the lumbar muscles. The organ was removed, not without difficulty, and, as is common in such cases, shock was not increased when the spleen was removed from the body. The tumor was found to weigh nine pounds. Saline transfusion was continued during the entire operation. She was somewhat shocked, but rallied completely six or eight hours after the operation. The oozing from the abdominal wound was free during the first twenty-four hours, the dressings requiring to be frequently changed. The patient died on the fourth day, apparently, of exhaustion; the temperature never reached over 100°.

CASE III. OPERATION FOR APPENDICITIS ATTENDED BY ALARMING HEMORRHAGE CONTROLLED BY HÆMOSTATIC FORCEPS LEFT ON THE VESSEL.

By the courtesy of my colleague, Dr. Frederick A. Packard, I was asked to see in the medical wards of the Philadelphia Hospital,

a patient under his care suffering from appendicitis. I found a man about forty years of age, who had been admitted to the institution the night before. He stated that he had been sick for two days previous to his admission, and the case presented all the symptoms of beginning suppurative appendicitis. I advised immediate operation. On opening the abdomen the viscera were found to be thoroughly adherent. The omentum was loosened by dissection and the adhesions separated until the appendix was exposed. It was firmly adherent to surrounding structures, especially the tip of the organ, which was bound down to the floor of the pelvis. On separating the appendix a small abscess was ruptured, which discharged about a tablespoonful of fetid pus. The appendix was then freed, with the exception of what seemed to be a slight adhesion of the tip of the organ in the depths of the pelvis; on breaking up this attachment there was a gush of venous blood which instantly filled the wound. A large piece of iodoform gauze was packed firmly in the wound and controlled the bleeding temporarily; as soon as it was disturbed, however, free hemorrhage immediately followed. Being uncertain what vein had been torn, and suspecting that it was either the internal iliac or one of its large branches, it was deemed safest to attempt to ligate the vessel. I directed the assistant to very slowly turn the gauze packing, which was in contact with the pelvic wall, backward toward the abdominal cavity: as he did this, I followed the opening with a pair of hæmostatic forceps until the bottom of the wound was reached, when I observed that blood began to ooze from beneath the gauze. The forceps were quickly passed beneath the packing and the bleeding vessel secured. The gauze was then removed and I observed that a large vein had been clamped, but its depth in the pelvis was so great, and the surrounding adhesions were so complete, it was impossible to apply a ligature, and it became necessary to leave the forceps *in situ*, allowing the handle of the instrument to protrude just above the incision in the skin. A small amount of iodoform gauze was packed around the forceps and the wound closed in the usual manner. The forceps were not removed until the seventh day. No further hemorrhage occurred and the patient made an uninterrupted recovery.

CASE IV. WOUND OF THE FEMORAL VEIN MADE WHILE REMOVING DISEASED GLANDS OF THE GROIN, HEMORRHAGE CONTROLLED BY MEANS OF HÆMOSTATIC FORCEPS APPLIED TO THE VESSELS.

The patient was a laborer, forty-one years of age, admitted to Jefferson Hospital during the month of February last. He was suffering with multiple sinuses, in the right groin, leading to broken-down and

diseased glandular structures. The original cause of the trouble was a chancroidal infection incurred four years previous to his admission. He had hitherto undergone several operations without benefit. The groin and Scarpa's space were found to be full of sinuses discharging pus. The overlying skin was thick, nodular, cicatricial tissue. The sinuses were laid open; the diseased skin and all diseased glands were removed except where the internal saphenous joined the femoral vein. On dissecting out, in this neighborhood, a large gland which was adherent to the vessels, the long saphenous was torn just as it enters the femoral vein. The assistant immediately placed his index-finger on the wounded vein and controlled the hemorrhage until the gland could be dissected out. It was then found that the saphenous vein had been torn off so close to its junction with the femoral that it was practically a wound of the latter vessel, so that it was impossible to apply a ligature, owing to the nodular and cicatricial tissue in which the vessel was embedded. The proximal end of the saphenous vein was ligated and hæmostatic forceps were placed above and below the wound in the femoral vein and were not removed until the seventh day. No further hemorrhage occurred. The patient made a slow but uninterrupted recovery.

A case treated in a similar manner is reported by Dr. John B. Roberts in *The Annals of Surgery* for January, 1898, in which hemorrhage from the subclavian vein was controlled by the method just described. I have been in the habit of controlling hemorrhage in this manner for some time past in cases in which a ligature could not be readily applied, and have always found the procedure most satisfactory. In profuse hemorrhage, in deep-seated wounds of the male perineum, it has been my custom, for several years past, to clamp the vessel by means of hæmostatic forceps, to be removed on the fourth or fifth day.

CASE V. GANGRENOUS OMENTAL HERNIA WITH PRACTICALLY NO CONSTITUTIONAL SYMPTOMS.

In January last, I was called in consultation by Dr. Stillwell to see a man suffering from strangulated hernia. The patient stated he was forty years of age, and had suffered for the past two years from a reducible, indirect, inguinal hernia, for which he had worn a truss. Three days before I saw him the hernia became distended, and he found reduction impossible. As it gave him no pain, he paid no further attention to it until the following day, when it began to be more or less tender. He sent for his family physician, who made several unsuccessful efforts at reduction. The following day the tumor was somewhat in-

creased in size, the overlying skin had become reddened, the parts were very tender to the touch, and the temperature went up to 102°; there were slight nausea and vomiting, but no symptoms of obstruction, as the bowels moved freely. On examination the hernia was found to be about the size of a lemon in the left inguinal region, and was very tender to the touch. The temperature was 99° and the pulse 120. Immediate operation was advised. On opening the sac a mass of gangrenous omentum was exposed to view, which was ligated and removed. The patient recovered without any untoward symptoms.

The interesting feature of this case is the fact that, with the partly gangrenous omentum, there should have been little or no constitutional symptoms. Before the operation, the temperature had fallen from 102° to 99°; the tumor was tender on pressure, but there was less pain than there had been previously; the most significant point being the pulse, which was 120, and which was quite out of proportion to a temperature of 99°. Experience has taught me in cases of suppurative appendicitis with probable gangrenous appendix that the temperature is not always reliable; with a condition of this kind the temperature may drop, while the pulse increases in frequency. A rapid, full pulse, with a low temperature and well-marked local symptoms, are usually indications for surgical interference; it was for this reason that I inferred that some serious changes were taking place within the hernial sac, and advised an operation.

CASE VI. AMPUTATION OF ALL THE TOES OF BOTH FEET FOR DRY GANGRENE; THE LINE OF DEMARCATION EMPLOYED IN THE FLAPS.

This case is of interest as demonstrating what may be accomplished by conservative surgery. The patient was admitted to the wards of the Philadelphia Hospital suffering from gangrene of all the toes of both feet, the line of demarcation having formed at the metatarsophalangeal articulation.

On examining the case it looked as if, in order to get a healthy flap, that amputation would have to be performed about the middle of the metatarsal bones, thus destroying the metatarsal arch and interfering with the usefulness of the feet. Had the amputation been performed at the point of election it would have probably prevented the man from doing any further work as a day laborer. It was, therefore, decided to endeavor to cover the ends of the bones at the line of demarcation. The granulation tissue was pushed away from the articular surfaces of the joint by means of a blunt periosteal separator. The ligaments were severed and the phalanges removed in the usual manner.

The flaps thus obtained, covered with granulation tissue, were then freshened by means of the scissors and approximated with interrupted silkworm-gut sutures, and to my surprise union took place by first intention, the man being practically well on the eighth day; this patient recovered with thoroughly useful feet.

CASE VII. REMOVAL OF TWO HUNDRED AND EIGHTY GRAINS OF WHITE WAX FROM THE MALE URINARY BLADDER.

G. L., twenty-five years of age, was admitted to the wards of the Jefferson Hospital during last September. He complained of a frequent desire to urinate, followed by hemorrhage at the termination of the act. Pain, referred to the neck of the bladder and to the meatus of the penis, was experienced at the end of micturition. He stated that, twenty-four hours previous to his admission, he indulged in sexual intercourse, and in order to prevent his mistress from becoming impregnated, he inserted into the urethra a roll of white wax, eight inches long and about twenty-six millimetres in circumference. This was passed into the urethra until its end was just within the meatus. Almost immediately after intercourse had begun, he felt the wax bougie slip into the bladder, the sensation was associated with a good deal of pain. On completing the act he discovered blood oozing from the meatus and felt a burning, stinging pain in the vicinity of the neck of the bladder. The introduction of a stone searcher readily detected the foreign body. Suprapubic cystotomy was performed, and, on opening the bladder, it was found that the wax had become rolled up in the shape of a large ball. On attempting to deliver it by means of the lithotritic forceps, the blades of the instrument became buried in the soft mass and when traction was made the wax was pulled out in a long thin strip, which could be stretched several inches beyond the abdominal incision. In order to remove the mass, it became necessary to insert into the bladder the index fingers of both the right and left hand, to grasp the mass and mould it into the shape of a sausage. By this means it was brought to the outer edge of the abdominal incision, where it was grasped by hæmostatic forceps and held until it was caught at a point below by means of a second pair of forceps, thus gradually, hand-over-hand, it was finally removed. It was deemed fortunate that the suprapubic route was chosen in preference to the perineal, for, had the latter operation been selected, it would have been impossible to have removed the wax, and the bladder would probably have been a good deal damaged by the attempt. The wax had to be grasped with the forceps while in sight, the touch being deceptive, the soft wax feeling exactly like the

wall of the bladder. Many strange foreign bodies have been removed from the bladder, but, so far as I know, the history of this case is unique.

CASE VIII. APPENDICULAR ABSCESS RUPTURING INTO THE SAC OF A REDUCIBLE INGUINAL HERNIA; OPERATION BY DRAINAGE, WITH PERMANENT CURE OF THE HERNIA.

In December of last year, I saw a case of chronic appendicular abscess in consultation with Drs. Ott and Musser, of which the following brief history was obtained. The man had been an invalid for some time; he had a history of a well-marked attack of appendicitis from which he had recovered. He had been ill for the past ten days. He had suffered for years from a reducible hernia, for which ailment he wore a truss. When he was first attacked he reduced his hernia, and, as was his habit, removed the truss before retiring for the night. In the course of a few days a well-marked, circumscribed abscess formed in the region of the appendix, and suddenly, two days before I first saw him, a tumor presented itself at the hernial outlet, descending partially into the scrotum. It was hard, inelastic, and tender on pressure; there was no impulse on coughing; it was not translucent, and it was thought to be an incarcerated, omental hernia. Operation was decided upon. The abscess was opened by the usual abdominal incision and drained. On making pressure on the scrotal tumor, pus immediately began to flow from the abdominal wound, and it was evident that the abscess had been ruptured into the hernial sac, which had become cut off from the general peritoneal cavity. The abscess in the scrotum was opened and thorough drainage established. The wound gradually healed, and the patient has had no recurrence of the hernia, and has not worn his truss since his recovery.

CASE IX. INTERSUSCEPTION OF THE BOWEL RELIEVED BY OPERATION; RELAPSE IN A WEEK'S TIME, MAKING A SECOND OPERATION NECESSARY.

The patient is an Italian, forty-eight years of age, who was admitted to the Philadelphia Hospital in January last. Owing to his lack of knowledge of the English language, it was wellnigh impossible to obtain a history of the case. He complained of a tumor on the left side of the abdomen, which was painful and tender to the touch. He stated that two days previous to his admission the swelling had appeared suddenly, and had gradually increased in size. The bowels had not been moved for the past three days; but this was not an uncommon condition, as he generally suffered from constipation. The tongue was

coated; temperature 100°, pulse 110. He had vomited several times since his admission, the ejected matter being of a watery character. Previous to my first seeing him, salines had been administered, together with highly stimulating enemata, and without benefit.

A diagnosis of intestinal obstruction was made, and an operation decided upon. The abdomen was opened over the long axis of the swelling, and on exposing the intestines, it was seen that the descending colon was enormously distended; it was also hard, rigid, and evidently impacted with a mass of solid matter. On passing the hand upward toward the transverse colon, the impaction could be traced as far as the hepatic flexure, where it seemed to disappear; on carrying the hand downward, toward the sigmoid flexure, it was discovered that the thickened colon terminated in a large round body. On making pressure at that point, the lump gradually began to recede along the descending colon, and by gently pushing it along until the hepatic flexure was reached, it suddenly disappeared, leaving the intestines in a normal condition. It was then very evident that we were dealing with an intussusception of the ileum and part of the ascending colon, which extended from the hepatic to the sigmoid flexure. The wound was closed in the usual manner. In the course of a few hours the bowels moved, and the patient made an uninterrupted recovery. On the eighth day the tumor suddenly reappeared, together with all the symptoms of obstruction. The abdomen was opened through the previous incision, and the same condition found to pertain as had existed on the preceding occasion. In order to prevent a recurrence of the intussusception an incision was made in the left hypochondriac region and the ascending colon exposed. The ileum, just as it joins the colon, was then stitched to the peritoneum in hopes that a recurrence of the trouble would be prevented. The bowels moved a few hours after the operation, and the patient did well until the third day, when he died apparently of exhaustion. The post-mortem exhibited in the vicinity of the head of the colon a slight localized peritonitis, but it was not sufficient to cause death.

CASE X. CHRONIC HÆMATOCELE OF THE TUNICA VAGINALIS TESTIS ASSOCIATED WITH AN ENCYSTED OMENTAL HERNIA RESEMBLING MALIGNANT DISEASE OF THE TESTICLE.

The patient was admitted to the Jefferson Hospital in April, 1899, affected with a tumor of the left testicle which was the seat of constant pain. Owing to the man's stupidity, it was very difficult to obtain an accurate history of the case. He stated that he had never been affected

by venereal disease, that the trouble with his testicle began five years previous to his coming to the hospital, and was produced by slipping from a scaffolding four feet high and striking the organ on the edge of a board. The injury was followed by great pain and immediate swelling of the gland. In the course of a few days the penis and scrotum became very much discolored, and remained so for many weeks. He was confined to his bed for three weeks after the injury. The swelling would subside and again recur, but never entirely disappeared. For the past three years, it had been growing perceptibly, at the same time becoming tense and hard. A large piriform tumor occupied the left side of the scrotum, reaching to the middle of the thigh. At the external abdominal ring, a large thick mass about the size of one's fist could be felt, extending into the abdominal cavity. The tumor was not translucent, and there was no impulse on coughing. The lower extremity of the tumor seemed to be cystic, as pseudo-fluctuation could be discovered on making deep pressure. The whole mass was compact and immovable, and apparently firmly attached to some structure in the abdominal cavity. The shape of the tumor was like that of a hydrocele, associated with a large inguinal hernia. Urine, heart, lungs, and temperature were normal. A malignant growth was suspected, and an exploratory operation advised. An incision fully seven inches in length was made, extending from above the external abdominal ring to the end of the scrotum. The subcutaneous tissues were enormously thickened, and changed from the normal condition. At the depth of about three-quarters of an inch the remains of the tunica vaginalis were located and opened. The cavity contained about three ounces of dark, grumous fluid. It was at first supposed that a cyst in the tumor had been opened; but, on examination, the thickened and irregular cavity was seen to be formed by the remains of the tunica vaginalis, which, in spots, was lined by calcareous plates. The testicle was atrophied and the cord was enormously thickened. On exposing the growth above the testicle, a large mass of omentum which had undergone fibrous change was laid bare, and looked not unlike the section of a fibroma. This mass was traced into the abdominal cavity for some distance, where it was found to be attached by a pedicle to the healthy omentum; it was ligated, and together with the testicle removed. The peritoneum was closed by means of a continuous catgut suture. The muscular structures were approximated by interrupted sutures of kangaroo-tendon; the muscular walls being brought together as far down as the upper portion of the scrotum. The incision in the skin was closed by Halsted's subcuticular stitch. The patient made a prompt recovery,

and, although he has long since resumed his daily occupation, there has been no recurrence of the hernia.

It was impossible to obtain from the individual an intelligent statement as to the time of the first appearance of the hernia. It must have occurred subsequent to the appearance of the hæmatocele. He believed that the increase in size of the tumor was due to a growth of the enlarged testicle with which he had been afflicted for several years. In attempting to make a differential diagnosis, the possibilities of incarcerated hernia with hydrocele or of hernia with malignant disease of the testicle were duly considered. None of the cardinal symptoms of either hernia or hydrocele were present. The swelling was dense, hard, and not translucent. There was no impulse on coughing. It was constantly increasing in size, associated at times with a good deal of pain, the only sign of hernia being the large, sausage-shaped mass that extended from the scrotum through the inguinal canal into the abdomen.

DISCUSSION.

DR. MORDECAI PRICE related the history of a case of appendicitis attended by another surgeon. Forceps had been used to control hemorrhage and, in a few hours after the operation, the surgeon returning to his patient found that there had been very free bleeding. In spite of efforts to secure the vessel, the boy bled to death. It was found, post-mortem, that there had been necrosis of the large iliac vessel and death resulted from the long-existing suppurative process. It is surprising to Dr. Price that this accident does not occur more often considering the number of delayed operations for appendicitis. He has many times in operating on these cases found the iliac vessels much in evidence and was glad to continue the operation with very light packing, letting well enough alone. He thinks it well to call attention, as had been done by Dr. Horwitz, to the desperate cases of this form which are occasionally met and the resulting accident. The control of hemorrhage by hæmostatic forceps is frequent with Dr. Price in the performance of vaginal hysterectomy for cancer. The vessels are large and his rule is to clamp with a large hæmostatic forceps, and in thirty-six hours the secretions lessen and the forceps are removed. He has yet to learn of an instance in which the practice has done harm.

The case of wax in the bladder reminded him of a man who had eminent medical advice, and been treated for pain by narcotics and was finally relieved by his wife, with a dose of oil and the subsequent passage of two or three suppositories of wax or other insoluble material.

DR. J. M. SPELLISSY reported that several years ago he had the privilege of assisting Dr. Richard Wilson in a case similar to the one reported by Dr. Horwitz, in which hemorrhage of the femoral vein was effectively controlled

by hæmostatic forceps. In Dr. Wilson's case, also, the forceps were left on several days, and the patient, likewise, made a good recovery.

DR. A. J. DOWNES said that, in hemorrhage difficult to control by ligation, he favored the use of electro-hæmostatic forceps. He has worked on an instrument of this character and has used it five or six times. In hospitals equipped with electricity, there is no reason why hæmostatic forceps should be left in the wound. The electrical hæmostatic forceps are made in all sizes, and if forceps can be applied, they may be used with sufficient heat to control the blood-supply by desiccation.

DR. HORWITZ agreed with Dr. Price that the forceps were allowed to remain on the vessel longer than was necessary. The operation was performed three years ago. Dr. Horwitz knew of no precedent to guide him, and recalled an instance in which the elder Pancoast, having with difficulty controlled troublesome hemorrhage by a ligature embracing an unnecessary amount of tissue, objected to the ligature being removed and reapplied, saying: "When you get in a good place stay there."

Notes on the Silver-Nitrate Injections in the Treatment of Phthisis.

BY THOMAS J. MAYS, M.D.

[Read January 24, 1900.]

About a year ago I contributed a paper to the *Philadelphia Medical Journal* in which I gave an analytical report of the treatment of forty cases of pulmonary phthisis during the previous five months with the hypodermic administration of silver-nitrate over the course of the vagus in the cervical region. Of these cases, seven were in the incipient condition, eighteen in the second or advanced stage; and fifteen in the third, or the far advanced stage. The result of treatment in these cases after the passage of another year is as follows: The incipient cases are all well and are at work, or able to work; of the advanced cases five died, two continue invalids and eleven are well and at work; of the far advanced cases, eleven are dead, and four are alive, two of whom are able to be about and do light work. In regard to the high death-rate among the last class, it may be stated that seven of these were certain to die when the injections were begun—the latter having been given merely for the purpose of ascertaining what influence they would exert on this stage. Taking it all in all, therefore, there remain twenty, or 50 per cent., who are well at the end of one year and five months.

The strength of the silver solution which was used in most of the forty cases was five minims of a 2½ per cent. preceded by a cocaine solution of the same strength and the same dose—the latter being used to obviate the pain which would be produced by the former. The point selected for their introduction is immediately over, or slightly behind the pulsating carotid artery in the neck, midway between the angle of the lower jaw and the clavicle. In order to avoid puncturing the underlying artery or vein it is important to lift the skin between the thumb and forefinger of the left hand and introduce the needle just below the thickness of the skin. The intent is to produce a certain amount of counter-irritation over the vagus, and hence there is no need to penetrate deeper than through the skin. The following plan is a very practical one for the introduction of these agents: Inject the cocaine solution, detach the syringe from the needle, and let the latter remain in the puncture. Wash out the syringe with water, draw the silver solution into the syringe, attach the latter to the needle and throw in the required amount.

At the suggestion of my friend Dr. W. O. Hermance, I have constructed a double-barrelled syringe, of the ordinary hypodermic size, containing a stopcock, and a single nozzle, to which is attached the needle. One barrel is filled with the silver, and the other with the cocaine solution, and the required amount of each may be injected without detaching the syringe from the needle. I have used this syringe with a great deal of satisfaction in hospital and dispensary work. It saves time when a number of patients are to be injected at one visit.

In regard to the side of the neck which ought to be selected for the injections it may be said, as has been done in my previous communications, that this varies in different individuals, and even in the same individual at different periods, and cannot always be readily determined in advance. It is a good plan, however to give most of the injections on the side of the neck below which the involved lung is located, for it will be found that pressure over the course of the vagus on the side of the affected lung in many phthisical persons is more sensitive to pressure than the other nerve—indicating that the lung and the nerve of that side are simultaneously involved.

The number of injections, which are necessary, depends on circumstances. It is a good plan to begin with one injection on the side of the neck on which the affected lung is situated. In a week or ten days this is to be repeated, unless the original, or previous injection is followed by too much irritation. In urgent cases due to excessive coughing I have repeated the injections in three or four days. Most

of the injections should be given on the affected side, and occasionally one on the opposite side. So far as my records show, twenty-one was the highest number of injections I gave to one patient.

During the last seventeen months I have administered the silver injections to more than one hundred and fifty consumptive patients from which the following deductions may be drawn concerning its remedial value in this disease :

Cough and Expectoration.—These injections were primarily undertaken with the thought of benefiting the cough and expectoration, and nothing else, and it was gratifying to find that, with but few exceptions, these symptoms improved in a marked degree, sometimes they would cease almost entirely after the first and second injections. This was chiefly true of the incipient and advanced cases, but also benefited the far advanced ones in this respect. Besides relieving cough and expectoration the injections also have a beneficial influence on dyspnoea and oppression in the chest. This property is well brought out in the alleviation which they give to the symptoms of asthma.

Vomiting.—One of the most distressing features of phthisis is the vomiting which ensues in its later stages. It usually occurs after meals and is nearly always preceded by cough. This symptom is frequently relieved in the far advanced cases.

Appetite.—In the great majority of cases the power of eating was increased and sometimes to a remarkable degree. This was, of course most noticeable in the incipient and advanced, although it also held true in some of the far advanced cases.

General Strength.—This was greatly benefited in most of the incipient and advanced cases, and also in a number of the far advanced cases. How to account for this improvement, which frequently follows immediately after an injection is perhaps difficult, but the fact exists and forces itself too often on one's attention to escape notice.

Physical Signs.—In many of the incipient, in some of the advanced, and in a few of the far advanced cases, there was noticed marked improvement in the physical signs.

Fever.—A decline in temperature has been frequently observed by the writer. Others have noticed this, too, in their cases.

Night Sweats.—Diminution and in some cases cessation of the night sweats have been noticed.

Weight.—It has been stated, already, that these injections were undertaken with a view of relieving the cough and expectoration of phthisis, and it was surprising, therefore, to find that they all exerted a most beneficial action on the body-weight. The gain is principally

confined to incipient and advanced cases, but it has also been seen in far advanced cases to some extent. Indeed this phenomenon, as it has shown itself in some cases, is really surprising, since it seems barely possible that an almost insignificant quantity of nitrate of silver thrown in the neck once a week, should increase the weight of patients from four to six pounds a week, as I have observed in a number of cases. Thus of five patients who have gained most, one gained 5 pounds the first week after the injections were begun, 6 pounds the second, 4 pounds the third, and 3 pounds the fourth week; gained altogether 23 pounds. Another one lost 1 pound in two days immediately preceding the first injection; gained 1 pound first week after injection; 4 pounds, second week; 3 pounds, third week, and 4 pounds, in fourth week; gained altogether 17 pounds. Another one lost 3 pounds in five days immediately preceding first injection, gained two pounds in first week; 3 pounds, second week; 2 pounds, third week; 4 pounds, in fourth week; gained altogether 30 pounds. Another lost 1 pound during week preceding the first injection; gained 3 pounds, first week after injection; 4 pounds, second week; 2 pounds, third week; gained altogether 14 pounds. Finally, another gained 7 pounds in first six days after injection, 3 pounds, second week, and 2 pounds the third week; gained altogether 26 pounds. Not all patients who recovered gained in flesh. Indeed three lost while improving in every other respect. These are working now.

In an interesting contribution to this subject, published in the *Philadelphia Monthly Medical Journal*, July, 1899, p. 406, Dr. Gosman of Brooklyn, New York, reports twenty cases of pulmonary tuberculosis treated by hypodermic injection of silver-nitrate over the pneumogastric nerve. The conditions under which these cases were treated are stated by Dr. Gosman to have been as follows: "(1) They were all cases in which the diagnosis was unquestionable, the bacilli being found in the sputum. (2) They all had been treated for some time without any benefit. (3) In all, the surroundings, habits, general treatment, etc., were identical before and after the injections. (4) No case is reported that was under observation less than five weeks, and most of them were observed for two months or more. (5) Fifty per cent. of them had complicating diseases, like mitral and aortic regurgitation, tubercular abscess, gastritis, double hernia, nephritis, etc., which were anything but favorable to good results."

In analyzing the results in Dr. Gosman's cases it will be seen that the aggregate gain in weight of seven of the incipient cases was 39½ pounds, or an average gain of five pounds and a half—a result which

is not an unfavorable exhibition of a remedy when applied to cases in which other treatment had proved futile, especially when it is considered that at least three of the seven cases had complications. In the advanced and far advanced cases, there was practically no gain in flesh, cough and expectoration ceased entirely in two, improved in ten, and failed to improve in eight cases. In those cases in which a record is given of the physical signs it is shown that these disappeared in one, improved in three, and became more pronounced in two. The temperature improved markedly in five, slightly in eight, and did not improve in seven cases. Its action on the night sweats seems to have been the most uniform and constant. This symptom abated entirely in eighteen, and improved in two cases. The general strength, appetite and sleep improved in about half the cases.

Dr. G. H. Franklin of Hightstown, New Jersey, expected to be present to-night but sends me word that he is unable to do so, and, therefore, I take the liberty of reporting the history of the following case that has been under his observation: A male, aged 50 years, without a family history of phthisis, had hæmoptysis February 24, 1897, which was believed to have been of traumatic origin. With the exception of general malaise, of which he complained in the spring of 1898, he was comparatively well until the following October, when he began to lose flesh. In December of the same year, he began to have slight hectic, morning chills, afternoon fever, and night sweats. January 1, 1899, he had an attack of grip, from which he rallied imperfectly. On the 16th he had right-sided pleurisy with infiltration of the upper part of the lung on the same side, and his evening temperature now began to range from 101° to 103° , his pulse from 100 to 110, and his respiration was about 24. Night sweats, cough, expectoration, and anorexia continued and he lost flesh rapidly. The treatment consisted of alcohol baths, rest in bed, cod-liver oil, hypophosphites, strychnine, creosote, forced feeding, and codeine to control the cough. On February 1st, when the case presented no visible improvement, a hypodermic injection of silver nitrate was given over the course of the right vagus—all the other conditions concerning treatment, etc., being maintained exactly the same as they were previous to the injection. His expectoration gradually lessened, and his cough ceased on the fourth day after the injection, so that the codeine was discontinued after the fifth day, his temperature became normal, pulse fell to 80, respiration to 18 and 20, night sweats ceased, appetite improved, and he began to gain in flesh. The whole aspect of the case was changed, and he rapidly improved. A second injection was given on the left side on the

eighth day, and another a week later on the right side, although they did not seem necessary. When in health, he usually weighed 140 pounds. On December 12th, he weighed 130 pounds, and estimating that from that date to February 1st, the time of the first injection, and when he could not leave his bed to be weighed, he lost at least ten pounds, his weight on the latter date would have been 120 pounds. February 25th, twenty-five days after the first injection, he weighed 148 pounds—having gained approximately 28 pounds. On March 6th, his weight reached 152 pounds, and now he weighs ten pounds heavier than he weighed for ten years.

From my own experience and that of others I believe that the following deductions may be drawn concerning the action of silver-nitrate in the treatment of pulmonary phthisis: (1) That its best results are obtained in incipient cases, both in regard to the symptoms and physical signs; (2) that in most of the advanced cases of this disease it has a beneficial, and in some instances, an exceptional influence on the symptoms and physical signs; and (3) that in the great majority of far advanced cases it ameliorates the cough, expectoration, and other symptoms temporarily; while in a few instances of this kind its effects are apparently lasting.

In conclusion, I believe that there is much reason for believing that when this method is combined with other hygienic, dietetic, and medicinal treatment, such as many of my patients did not receive, its practical usefulness will be greater than that represented above.

DISCUSSION.

DR. H. A. HARE said that in foreign medical societies he had noted that colleagues had less hesitancy in criticising each other's papers than was prevalent here, and yet, that, after the foreign meetings, there was no manifestation of feeling as sometimes occurs after meetings in this country. What he was about to say was to a scientific society and with no personal feeling.

He felt that the County Medical Society could not afford to have a paper reporting the treatment of pulmonary tuberculosis by injecting silver-nitrate over the pneumogastric nerve read without some member pointing out its errors, in order that practitioners outside of the Society might know its attitude toward it.

First, this method of treatment has absolutely no sanction in pathology. It is not necessary to go into the pathology existing in pulmonary tuberculosis, to speak of its bacteriology, or to describe the physiology of the pneumogastric nerve. He did not see how Dr. Mays could explain that injections relieve a dyspnoea. Why should nitrate of silver be picked out for this extraordinary therapeutic use? There are other substances which would be quite

as efficacious, not better, but just as good—such as carbolic acid, which coagulates albumin. How can nitrate of silver be of advantage in checking sweats, which evidence profound malnutrition and toxæmia.

The asserted gains in weight had been heard of, but with a great difficulty in thought that the measurements could be correct. It was beyond Dr. Hare's comprehension that any man suffering from pulmonary tuberculosis could gain five or six or seven pounds a week with no other treatment over and above a few injections of nitrate of silver over the course of his pneumogastric nerve.

The remarks were made, not only because he wished to call attention to a paper misleading to the profession, not because he had any personal feeling in the matter, but because it seemed to him a word might be said for the many patients suffering from tuberculosis who are subjected to this treatment. It is known that in cases of tuberculosis, the mere passing into the hands of other physicians will cause not only extraordinary improvement in the patient's mental condition, but also in the pulse, respiration, and in other parts of the economy.

DR. A. O. J. KELLY said that he had listened to Dr. Mays' paper with great astonishment, but admitted that any treatment of pulmonary tuberculosis that results in the recovery of 50 per cent. of the cases, as was indicated by Dr. Mays, certainly demands serious consideration. In view of previous ideas on the subject, he asked Dr. Mays to state the physical signs and the condition of the lungs of the patients, formerly in advanced phthisis, but now well. Dr. Kelly supposed that some of these patients must have had cavities in their lungs, and he asked what became of the cavities, as well as of other morbid processes, under the influence of Dr. Mays' treatment.

DR. JOHN D. McLEAN in answer to the remarks of Dr. Hare concerning the correctness of the weights, said he was responsible to Dr. Mays for the weights of some of the patients reported. Dr. McLean had the opportunity of seeing a great number of these cases. What impressed him forcibly was that, with the exception of the injections, the medication had been almost unchanged, and that after the injections the patients presented a much more favorable report. The full records taken will bear this out. Of these cases, there are three which are very interesting. One was that of a man of thirty-five years, who did not look or feel badly, but who, on examination, exhibited infiltration and a surprising and rather good-sized cavity in the upper lobe of the left lung. After treatment for a number of months he reported that he had no cough for the previous six weeks. As was stated by Dr. Mays in his paper, it was surprising that cough was controlled at an early period after the injections. In one case, in which the injection was given on one day, the patient stated that on the day following he had had no cough since the preceding night, but the expectoration was just as profuse.

DR. HENRY BEATES, JR., said, as a student in the dissecting-room, he had often been impressed with the number of cadavers that gave unmistakable evidences of tubercular disease of the lungs having been suffered and having

gotten well under conditions in which treatment could not have been allowed the claim of contributing to such favorable terminations.

The spontaneous tendency of pulmonary and other forms of tuberculosis to get well should not be lost to view. To know the actual percentage of recoveries attributable to therapeutic and to non-therapeutic measures would be of value and interest. The claims of nitrate of silver to have exerted a marvellous effect might be thus answered. Without going into details, attention might be called to the physiological effects of cocaine. As equal quantities of cocaine and silver nitrate are used in the injections, it seems probable that the prompt relief of cough is thereby explained; also the action in checking tissue waste is, in a measure, accounted for. The physiology of the laryngeal branch of the pneumogastric cannot be forgotten; neither can the relation that cocaine bears to it in modifying the circuit involved in the production as well as the relief of cough.

DR. A. A. ESHNER said that in order to give the discussion a proper basis he would ask Dr. Mays to give his views as to the pathology of tuberculosis, or, rather, the pathology of "phthisis," as Dr. Mays ordinarily does not use the term "tuberculosis," but speaks of the disease as "phthisis" or "consumption."

Clinicians recognize the fact that every impairment of resonance, every alteration in breath-sounds, every increase in vocal resonance and fremitus do not necessarily indicate what is commonly designated pulmonary tuberculosis, and, in the so-called incipient cases, particularly, most clinicians would hesitate to make a final diagnosis without examination of the sputum.

DR. MATHEW WOODS said that he had little experience in this form of treatment, having had but one case, that of a man in his employ, who had developed phthisis and became incapacitated for work because of cough, that refused to yield to ordinary remedies. As a last resort, Dr. Woods persuaded the man to consult Dr. Mays. One injection was received and for five days afterward cough was almost entirely relieved. The patient's neck became enormously congested as a result of the injection, and fear of a return of this condition prevented him from submitting again to the treatment. He has since died. Dr. Woods had no fixed theory to account for the effect of the treatment upon the cough, except, perhaps, that of counter-irritation, and merely reported what occurred.

DR. H. A. HARE said that the speaker who followed him had stated that a patient treated with nitrate of silver had within twenty-four hours ceased to cough, but that the expectoration had not ceased. Dr. Hare added he had yet to meet with a tubercular case with expectoration and no cough. He also referred to the fact that, in taking measurements of a patient's weight, it must be borne in mind, that those people, who sell beef to the Government, take good care to water the cattle before they go on the scales. A man with a full bladder and impacted colon could well seem to have gained six pounds in a week and, unless much care is taken, he did not think that accurate records could be made as to exact bodily weight.

DR. THOMAS J. MAYS, in closing the discussion, said he did not fill his

patients with water and let their bowels become impacted in order to get heavy weights. It seemed beyond his comprehension why Dr. Hare should charge every one associated with the silver treatment as being in a conspiracy to subvert the truth. It is perfectly immaterial whether the injections act in harmony with the bacillary or nervous theory, or whether they act on the afferent or efferent fibres of the vagus, so long as they act favorably on phthisis. Dr. Hare also asserts that phthisis is not an asthmatic disease, and that, therefore, one cannot judge of the influence of the silver injections on dyspnoea, while the truth is, and it does not require many years of experience to find it out, that asthma is not an infrequent concomitant of phthisis.

Furthermore, silver-nitrate was not selected in the belief that it had any greater specific counter-irritant effect on the pneumogastric than other agents of the same class. Chloride of zinc, iodine and carbolic acid also commended themselves, but Dr. Mays preferred the first because more is known about its hypodermic use than about the others. No theory was offered why the injections affected the sweats, but that they do this is evident from Dr. Gosman's experience. The large gain in weights of the patients was a surprise, but there was no gainsaying the fact. Some do not gain in flesh, but gain in other respects. The effects of the injection are not due to the cocaine, as is believed by Dr. Beates. When the injections were first tested the silver solution was used alone in three or four cases, and the result was the same, barring the greater pain at the seat of injection.

Concerning the pathology of tuberculosis or of phthisis, Dr. Mays has no hesitancy in expressing his own views, but asked to be excused from doing so as it would take too long.

The speaker must have been misunderstood by Dr. Kelly in regard to the recovery of 50 per cent. of the far advanced cases. Only two of the far advanced cases are alive to-day. Both are doing fairly well. Those, who recovered, belonged to the incipient and advanced classes. All the cases, that have lost flesh and that have fever without destruction of lung tissue, are classed as incipient. Those that have a high fever and have lost much flesh, and that have softening of the lungs, are classed as advanced cases; and those that have cavities are classed as far advanced cases. To go into the physical signs of the two far advanced cases, which are alive, did not seem necessary.

DR. HARE asked that the records be corrected in reference to the statement made by Dr. Mays, that, Dr. Hare had said, dyspnoea was not often found in phthisis. What he said was, that asthma was not often observed in phthisis. He also requested the official record changed in that, in no way, had he intimated that there had been any falsification of the report. He merely pointed out the fact, that great discrepancy in weight might have occurred under circumstances beyond Dr. Mays' control.

DR. KELLY stated that he had not meant to question the reliability of Dr. Mays' observations and statistics. He had understood Dr. Mays to state, and he believed that he himself had stated that Dr. Mays had reported that 50 per cent. of all cases had been either cured or improved so as to be able to work.

Two Cases of Brain Abscess (One of them Multiple).

BY W. W. MOORHEAD, M.D.

[Read January 24, 1900.]

These two cases of brain abscess are reported in the hope that, in time, a sufficient number may be published, to enable us to make a reasonably sure diagnosis, in these confessedly obscure cases. The first case is reported in detail; with pulse, temperature and respiration chart. The second case, unfortunately, was unable to employ a trained nurse, and was only seen once daily, and sometimes only every second day; so the report of it is less full. The lung trouble in this case would naturally so affect the respiration, that no record of it is presented.

CASE I.—S. F. B., male; age, 42; married; publisher. His history I give from notes in my case book, under date of Jan. '97; when he consulted me for some digestive trouble. "His father died at the age of 62, of Bright's disease; mother died at same age of 'paralysis and nerve exhaustion.' He was one of seven children; the first, a sister, died at the age of two and a half years, of cholera infantum; one brother and four sisters were living and healthy.

The patient had scarlatina in childhood, which was followed by a discharge from the left ear, which continued off and on, for four years; since then he has had no pain or discharge from either ear. He had typhoid fever in childhood, had spinal meningitis about four years ago; but, has otherwise enjoyed good health. He has used tobacco and liquor since the age of fourteen; has had gonorrhœa but denies syphilis."

Examination at that time showed the temperature to be normal; the pulse, 80; the respiration, 18; the second heart-sound was accentuated, the apex-beat was displaced slightly down and out from the normal position, there was no valvular murmur. The lungs were normal, and the patella tendon reflex diminished.

The right eye vision equalled 5/9; the left eye vision equalled 5/12; with proper correcting glasses, vision in both eyes was normal. The pupils were equal, 2½ mm., the irides responded promptly to light, accommodation and convergence. The optic disks were gray in color, with physiological excavation; the arteries of the retina were small; the veins were large and full. The right ear had normal hearing, the left ear could not hear a watch on contact, and the drum-membrane was lost. The urine was of dark straw color, faintly acid, with specific gravity of 1020, and had a trace of albumin. There were no casts, but numerous pus cells were found under the microscope.

On Oct. 8, 1897, I was asked to see him at his house. From his wife I learned that he had gone to New York ten days previously, expecting to return Oct. 5th. On that date his baggage came, but nothing was heard from him, until he arrived on the morning of the 8th, with his clothing in a filthy condition, and his undershirt on wrong side foremost. I found him thoroughly cleaned and in bed. He recognized me at once, and would answer general questions, but appeared to be in a dazed condition, and unable to give the slightest information concerning himself during the preceding week.

He had an abraded, granulating sore on the front of his left shoulder, and several small bruises on his back and limbs. There were no recent scars or bruises on his head. His pulse was 72, temperature 98.5° and respiration 18. The pupils were even, 2½ mm. and reacted to light. He dozed occasionally during the day and slept quietly through the night.

On the 9th, his condition was about the same. He had incontinence of urine and the bowels were obstinately constipated.

Oct. 10th, his pulse was 48, temperature and respiration normal, his bowels moved slightly; he was very drowsy, but heard and answered whispered questions.

Oct. 11th, the pulse 44 to 50; the temperature and respiration normal; he heard and understood what was said; lay with eyes closed, and recognized friends; the tongue was protruded in a straight line, and there was partial paralysis of the left side of the face. The left arm and leg showed decided loss of power.

In the evening Dr. L. J. Hammond saw him in consultation, and after careful examination, advised against operation, in absence of definite localizing symptoms. The bowels were freely opened by copious enemata. Examination of the urine showed the specific gravity to be 1025, and that there was neither albumin nor sugar.

The temperature chart shows the slight changes in his condition, from Oct. 11th to the 16th, when his temperature reached 103°. The patient was restless; his breathing was labored and noisy; he could not be roused to answer any questions, and he swallowed milk with much difficulty.

Dr. James Tyson saw him at 11 A.M., in consultation, and agreed that he had symptoms of pressure on the right side of the brain. He advised bleeding from the arm, which was done, to the extent of twelve fluidounces, and after the bleeding, the patient appeared to breathe somewhat more quietly. In the afternoon he was comatose and breathing irregularly.

Dr. Hammond saw him again at 6.30 P.M. and found complete paralysis of the left arm and leg. Profound coma was coexistent with Cheyne-Stokes breathing. As it was evident he could not live long without some relief, Dr. Hammond trephined over the right motor area, without finding any collection of blood or pus.

The operation was followed by no shock, and within an hour, the patient could move his left hand and arm. The next day he was conscious at intervals and swallowed with ease. He improved from this time, until Oct. 30th. He took milk freely, knew and named his friends, recalled incidents of his youth, and regained the use of his left arm and leg.

On Oct. 30th, his speech became indistinct and he had difficulty in swallowing. His pupils were unevenly dilated, the right 5 mm., the left $7\frac{1}{2}$ mm., both reacted to light. On the next day he had more difficulty in swallowing, and his speech became unintelligible.

Nov. 1st, he was in profound coma with Cheyne-Stokes breathing, the left arm and leg were paralyzed, and his condition was about the same as before the first operation. On consultation with Dr. Hammond, it was decided to operate the following morning. The next day, his condition was unchanged, and at 11 A.M. Dr. Hammond reopened the original wound and released a quantity of pus, estimated at two fluid-ounces. There was no shock following the operation, but the patient continued in an unconscious condition. His pupils contracted to their normal size, and the optic nerves, as before, showed no swelling. The paralysis of the arm and leg continued, his temperature rose irregularly, as shown by the chart; his pulse became gradually weaker, and his breathing continued labored and rapid, until he died, eight days after the operation.

The autopsy was made by Dr. Hammond twenty-four hours later. The body had been embalmed eight hours previously, and all the organs showed considerable hardening from the effects of the embalming fluid. On opening the thoracic cavity, the lungs were found normal; the heart was somewhat hypertrophied, but free from valvular disease. The kidneys were normal in size, the capsule stripped off readily, and the cortex was of natural width. The right kidney was of an intensely dark purple hue. The spleen was normal. The liver was enlarged and fatty.

On removing the skull cap some adhesions were found on the superior surface of the brain. A circular opening, one-third of an inch in diameter, was found in the right frontal lobe, leading into a cavity, which extended well forward and down to the corpus callosum, about

the size of a hen's egg. The ventricles were all healthy, and no other collection of pus was found in any part of the brain.

On summing up, I would note that headache and convulsions were absent all the time he was under observation. His bowels were constipated, except one day, Oct. 20th, when he had sixteen bloody stools.

Incontinence of urine continued during his illness. At the beginning of the attack the urine was free from albumin; later it contained 5 per cent. by bulk, and still later it was entirely free from albumin. Vomiting was absent throughout. The pulse was normal, or slower than normal during the first week, then irregular, and toward the end, quite rapid.

The temperature was normal for the first five days; it then rose, reaching 103° on the ninth day. It was subnormal then for several days, and then rose irregularly, till near the end it reached 104.8°.

The eye ground was normal throughout; the pupils reacted to light, were small and even except for a day or two, when they were unevenly dilated.

There was paralysis, more or less complete, of some of the muscles of deglutition, of the left face, and of the left arm and leg, during the greater part of the illness. There was no active delirium, but during most of the time, the patient was in a semi-comatose condition.

CASE II.—A. T. D., colored; male; age, 22; single; was attacked with severe pain in the right side of his head, on Dec. 2, 1899. I saw him that day and found him in bed suffering acutely.

He had lost his mother and one sister with phthisis; his father, one brother and two sisters were living and healthy. He had had the ordinary diseases of childhood. He never had any ear trouble, and denied all venereal diseases. He had had a cough as long as he could remember, but had always been able to work until the latter part of October, when he was confined to bed by enlarged, painful inguinal glands. These were thoroughly curetted on Nov. 14th, and the wound was healed, and he was out on the street by the end of November.

On examination, I found his pulse was 66, and his temperature 98°. His right chest was flat on percussion from apex to base, front and back, with increased vocal resonance and many moist râles. The left chest had good resonance and respiratory murmur throughout.

Dec. 4th, he was complaining of excruciating pain in the left side of the head, shifting from the jaw to the ear, and to the occiput. On examination, both ears were found free from congestion and with normal acuteness of hearing.

Dec. 5th, condition unchanged, pain still severe in both sides and in the back of head.

Dec. 6th, pain was still severe, he complained of dim vision ; his pupils were equal and reacted to light and accommodation.

Dec. 7th, pain less severe ; he said he could see nothing ; he denied light perception ; his pupils were 4 mm. and did not react to light ; his optic disks were normal and the retinal veins were full and tortuous. The patient said he could hear nothing, but replied to all questions, even if asked in a low tone of voice. Pulse 72, temperature 98.5°.

Dec. 8th, the patient was very restless and was kept in bed with difficulty, at times ; lay in a semi-comatose condition, and would give no response to any question. Dr. Hammond saw him in the evening in consultation. The patient was too restless to permit a satisfactory examination, but flatness of the right chest, and a heart impulse an inch to the right of the sternum, were noted. His pupils reacted slightly to light, but apparently there was no vision. The next two days the patient lay in the same restless condition ; the pulse was 76 ; the temperature, 97° ; he called frequently for his parents to save him.

On Dec. 11th, his pulse was 84, his temperature 99°. He was passing his urine unconsciously.

Dec. 13th, his pulse was 96 and his temperature 99°. Two days later his general condition was the same. The pupils were equal, reacted sluggishly to light, and the optic disks were normal.

On Dec. 17th, he seemed much weaker, his pulse was 120, his temperature 101°. He had been wildly delirious during the night, crying " Murder ! " and " Police ! "

On Dec. 19th, he appeared brighter and stronger than he had for twelve days. His pulse was 84, his temperature 98°, and he said he could see some, but his answers were very contradictory. He replied promptly to questions about himself, and said he had still slight pain in his head, which prevented sound sleep. His cough was frequent and expectoration profuse, as it was during his illness.

On Dec. 20th, he died, at 9 P.M.

Autopsy, twenty hours later, by Dr. Hammond. On opening the chest cavity, the left lung was found free from disease, and decidedly larger than normal. The right lung was collapsed, riddled with cavities containing pus, and very firmly bound down by adhesions. In retracting, the lung had drawn the heart over, so that a considerable portion of it was to the right of the median line. The right lobe of the liver was enlarged, dark in color, and very friable. The kidneys were slightly enlarged, dark in color, but showed no pathological changes.

On opening the skull, the dura was found adherent throughout. There were four abscesses found, varying in size from a large chestnut,

to that of a walnut. Three were filled with yellow pus, and one with dark green pus. One was in the temporo-sphenoidal lobe, one in each occipital lobe of the cerebrum, and the other was in the lower lobe of the right hemisphere of the cerebellum.

The diagnosis in both cases was uncertain until pus was found. In Case I., it was at first thought the patient might have been drugged or sand-bagged. The former theory was dropped, when the patient got worse instead of better, as the time passed, when the effects of drugs would have been dissipated; and the latter on account of the absence of any recent scars or bruises on his head. Case II., at first appeared to be suffering with neuralgia, but the pain was not relieved by remedies which would have given relief, had such been the case; and the symptoms soon became too grave to be due to that cause. When he feigned deafness, it was thought possible that his blindness and pains might also be exaggerated, and that there might be an hysterical element present.

Meningitis, severe enough to cause his symptoms, would have been accompanied by a more rapid pulse and higher temperature. Brain tumor was apparently excluded in both cases, by the absence of convulsions, vomiting and optic neuritis; also in Case I. by the absence of any pain in the head, and in Case II. by the absence of paralysis of any of the muscles of the body.

Thrombosis of the sinuses of the brain was seemingly excluded by the absence of oedema of the eyelids or mastoid, or distention of the jugular veins.

The diagnosis of brain abscess, agreed with the symptoms more nearly than anything else, but it seemed impossible to make a positive diagnosis until the brain was opened.

In Case I. the cause of the abscess was not determined, but in Case II. there was no doubt that the lung trouble was the origin of the multiple abscesses.

On the Diagnosis of Cerebral Abscess.

BY L. J. HAMMOND, M.D.

[Read January 24, 1900.]

If the instructive report to which we have just listened teaches anything, it is that cerebral localizations are not always available for surgical purposes; they are indeed, in my experience, seldom to be relied upon until the abscess has attained such proportions as to have so

destroyed the motor area, either by its own pressure or by œdema, as to render recovery of the mind, or the involved motor regions, practically impossible.

Up to the present time, it is by chance only, that a cerebral abscess can be located where no bone injury exists as a guide, and when the disease exists outside of the recognized motor area. It is therefore important, that every detail of the history be thoroughly examined into for symptoms that would warrant operative interference, before the destructive process has progressed sufficiently far to render treatment hopeless.

The specimen from the first case reported by Dr. Moorhead shows (which I here show you) an abscess cavity involving a large part of the right parietal lobe, extending well into the frontal. This should involve, according to the method of cerebral localization outlined by Lucas-Championnière, the ascending parietal, ascending frontal, third convolution, second and third frontal, and should entail a paralysis of the leg, arm and face of the opposite side, as well as aphasia. There were however, as the history shows, none of these symptoms sufficiently marked to justify the belief that this large abscess existed in this region, until the last days of the patient's life. The symptoms were the same as those seen in intracranial inflammations resulting from meningitis of traumatic or pyæmic origin, and in the present light of our knowledge could be taken only for such, which conclusion, as the post-mortem showed, would have been incorrect. The most natural question therefore arises: If any, what are the symptoms that would justify the conclusion that an abscess is present?

First, it may be stated that if the disease involves the fissure of Rolando, consequently the ascending parietal and frontal convolutions, paralysis may be expected to occur either in the opposite leg, arm or face, or aphasia be produced, one or all, according to the position of the abscess and the convolution involved as, according to Lucas-Championnière; involvement of the summit of the ascending parietal, would produce paralysis of the lower extremities; of the ascending frontal and parietal, paralysis of the upper and lower extremities; of the middle portion of the ascending frontal, the upper extremities; of the inferior third of the ascending frontal, and the foot of the third, paralysis of the upper extremities, and aphasia; of the inferior third of the ascending frontal, and foot of the second frontal, facial paralysis, while involvement of the foot of the third frontal, would produce aphasia; the slight difference between these points and those of Ferrier, is, if anything, in favor of the former.

Authorities express the opinion that abscess outside of the motor areas does not produce paralysis, they further assert that it does not occur in this area unless the ascending convolutions are involved ; this does not of course, include secondary conditions, which may, owing to the commissural connections of the various portions of the brain with the surrounding area of softening, give rise to paralysis. When the abscess is outside of this area, that we look upon as presiding over motion, it is especially important that symptoms be noted, that are sufficiently reliable to enable the surgeon to reach and evacuate the abscess through a trephine opening.

I have therefore considered the symptoms under three stages, under the first of which are specially noted, vertigo, tinnitus aurium, flushed face, dizziness, anorexia, contraction of the pupils, frequently, abnormal sensitiveness to light, intolerance to sound, fever, temperature ranging from 102° to 104° , pulse rapid and hard, and skin dry ; 2d, later, the above symptoms increase in severity, and in addition there are vomiting, great restlessness, jactitations, delirium and occasionally, convulsions ; 3d, usually, after about the third week, such pressure symptoms of abscess present themselves as, dilatation of both pupils, oscillations of the eyeballs, in some cases twitching or distinct spasm of the muscles, and marked drowsiness, and if the abscess be in the motor area, there will be paralysis, mental hebetude, slow pulse, subnormal temperature, at times rigors, and later profound coma and slow respiration.

I have never seen a case of cerebral abscess where the temperature was not subnormal, except when due to bone caries, either from the middle ear, or from the nasal cavity. Under these conditions there would likely be as the cause of elevation of temperature, a meningitis. I have also never seen convulsions in any case of cerebral abscess, and I doubt very much whether it be a symptom of any importance.

Should pressure occur to the sixth nerve, there should be squint ; should abscess occur in the frontal lobe, reliance must be placed entirely on the second and third stage symptoms ; if in the occipital lobe, motor symptoms will be absent, unless the cuneus be involved, when hæmianopsia of the same half of each retina should occur, or according to Oliver, monocular Argyll-Robertson pupil may occur if there be pressure on the angular or supramarginal gyrus. Local temperature over the two sides of the head, may also furnish evidence as to the seat of abscess. This, I have found to be very markedly increased over a cerebellar abscess. Pain, according to Ferrier, which is elicited by percussion, is of some importance.

With this group of symptoms, and the knowledge of the great fatality

of cerebral abscess, when not evacuated, as well as when evacuated late, I would consider it my duty to treat these symptoms upon the same principles that govern surgery in dealing with circumscribed collection of pus in other parts of the body, as no cases are on record where recovery has occurred from spontaneous evacuation, while autopsies prove that in the majority of cases, the abscess enlarges at the expense of the brain substance, until it destroys life, either by pressure, or by rupturing into the ventricles; a few cases have been recorded where the proliferating neuroglia has furnished a sufficiently firm sac wall, to permit the disease to remain stationary for a time only; the treatment, therefore, should consist in operating as soon as a reasonable certainty as to the presence of pus exists, the only contra-indication to operation being where the lesion is at the base of the brain, as indicated by paralysis of the cranial nerves, neuro-retinitis or Cheyne-Stokes respiration. (Gross and Seguin).

Indeed, in the present progressive age of surgery, with perfect cleanliness as the watchword, I believe it the duty of every surgeon to trephine the moment the early inflammatory symptoms begin to merge into those of delirium, great restlessness and jactitations, since several cases are recorded where failure to evacuate the pus at the time of operation, was followed in one case, in a few hours by spontaneous evacuation through the trephine opening, and in another, on the third day, showing that even though unsuccessful in removing the pus at the time of operation, the relief of tension may oftentimes serve as a safe mode of exit. It is never the operation, but the fatality of the disease itself which causes death. Therefore, if the abscess is not disclosed through the first trephine opening, a second, or even a third should be made at the possible point of suppuration, as there is practically no additional danger, or either opening should be enlarged if necessary by biting away the bone with bone forceps. With Reid's base line as a guide, any part of the skull can be attacked, it is however, never well to trephine immediately over a suture line.

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**Report of Seven Cases of Pulmonary Disease Which Were
Treated with Silver-Nitrate Injections.**

BY THOMAS J. MAYS, M.D.

[Read February 14, 1900.]

The cases, which I present before this Society to-night are supplementary to the paper which I read here on the 24th of last month. They consist of one case of asthma, chronic bronchitis, and incipient phthisis each, of three advanced cases, and of one far advanced case of phthisis. Although the injections were originally administered for the purpose of allaying the cough and expectoration of phthisis, I have seen proper to add reports of cases of asthma and bronchitis for the purpose of showing the influence of the injections on these diseases.

CASE I. ASTHMA.

William Collins, age 54, has been subject to asthma and bronchitis for a number of years. He found relief from strychnin and the hypophosphites. He had a return-attack on the 6th of last January, and received an injection of silver-nitrate on that date. Relief followed in a short time.

CASE II. CHRONIC BRONCHITIS.

On Nov. 5, 1898, I. F., whose brother died of phthisis, exhibited and had exhibited for some time, dyspnœa; cough; muco-purulent expectoration; and, throughout the whole chest, sonorous and sibilant râles. His weight was 134½ lbs. V ℥ of a 2½ p. c. sol. of silver nitrate, preceded by a similar dose of cocaine, were injected in the right side of his neck.—Nov. 19. V ℥ of silver nitrate solution were injected in the left side, his weight was 134½ lbs.—Nov. 27. The same dose of silver

nitrate was given in the right side, he was much better in regard to cough and expectoration.—Dec. 27. He was better and his weight, 139 lbs.—Dec. 31. V η of silver nitrate were injected in the left side.—Jan. 3, 1899. His weight was 139 lbs.—Jan. 7. He had no dyspnoea and his cough and expectoration were better.—Jan. 27. His cough was gone, he felt well, his general strength was very much better, and his weight was 137 lbs.—March 13. His weight was 141 lbs.—Dec. 5. His weight was 142 lbs.

CASE III. INCIPIENT PHTHISIS.

P. W., aged 23, was first seen Nov. 25th, 1899, when he had been coughing for five months with a muco-purulent expectoration. He had a poor appetite, lost some in flesh, and had marked dyspnoea. There was dulness in the supra and infra-clavicular regions extending to the second rib, and also present in the suprascapular fossa. Crepitant and sibilant râles were heard in the same area. The weight was 127 lbs. V η of a 2½ p. c. sol. of silver nitrate were injected in the right side. Dec. 2, 1899. His weight was 126 lbs. V η . were injected in his left side. Dec. 9. His weight was 126½ lbs. Dec. 16. His weight was 125½ lbs. His crepitant and sibilant râles had disappeared. V η . were injected in his left side. Dec. 30. His weight was 126½ lbs. Jan. 6. His weight was 128 lbs. Jan. 20. His weight was 126 lbs.

CASE IV.—CASE I. OF ADVANCED PHTHISIS.

C., aged 69, a laborer, was first seen Sept. 1, 1898, when he had been coughing for 8 mos. and had a very profuse yellow, and thick expectoration. He had dyspnoea, palpitation, vertigo and a poor appetite. There was no family history of phthisis. Sept. 27. He received an injection of V η . of a 1 p. c. nitrate of silver injection in the left side of the neck. Oct. 1. Cough, expectoration and appetite had very much improved since the injection, and he was very much pleased with its effects. Oct. 4. He was improved. His weight being 132½ lbs. Oct. 8. His weight was 133½ lbs. Oct. 11. His weight was 132½ lbs. V η . of a 2½ p. c. sol. were injected in the l. side of the neck. Oct. 15. His cough was much improved. Nov. 5. His weight was 139 lbs., and V η . of a 2½ p. c. sol. were injected in the r. s. of the neck. Nov. 17. His weight was 142 lbs., he coughed very little and had no expectoration. V η . of a 2½ p. c. sol. were injected in the right side of his neck. Dec. 3. His weight was 142 lbs. V η . of a 2½ p. c. sol. were injected in the right side of his neck. Dec. 24. V η . of a 2½ p. c. sol. were injected in the left side. Jan. 10, 1900. His weight was 143 lbs., and

V m. of a 2½ p. c. sol. were injected in the side. Jan. 21. His weight was 142 lbs. Feb. 1. His weight was 142 lbs.

CASE V.—CASE II. OF ADVANCED PHTHISIS COEXISTENT WITH
AN ANAL FISTULA.

L., aged 27, was first seen on December 23rd, 1898, when he gave the following history. He had coughed and expectorated a great deal during the last eight or nine years. His anal fistula was of some months' duration. The physical signs, at the time, consisted of dulness, and moist râles in the left apex and extending to the middle of the chest in front; also of dulness and a few moist râles in the left suprascapular fossa; his weight, then, was 120 lbs. He was under the care of Dr. Adler, who referred him to me, and who had prescribed for him half teaspoonful doses of equal parts of comp. tinct. of cinchona and of syrup of the hypophosphites four times a day. Dec 27. His weight was 119 lbs. His general condition was the same. On this date, he received an injection of V m. of a 2½ p. c. sol. of silver nitrate in the left side of his neck. Dec. 31. His weight was 120½ lbs. Jan. 2, 1899. His weight was 121½ lbs. Jan. 6, 1899. His weight was 124 lbs. He felt much better, his cough and expectoration were almost entirely gone, and V m. of solution were injected in the left side. Jan. 11. His weight was 126½ lbs. V m. were again injected in the left side. Jan. 13. His weight was 129 lbs.

CASE VI.—CASE III. OF ADVANCED PHTHISIS.

R. M., aged 43, was sick for one year. He had a severe profuse expectoration, cough, chills, fever, and night sweats. He had spat blood. His temperature was 101½° in the morning. He had lost about 30 lbs. in flesh, and weighed 137 lbs. He had pleurisy in the right side and a partial infiltration of the whole of the right lung. He gained seven pounds in six days after the first injection. He went to work at blacksmithing six weeks after he received the first injection, and he had not been able to work for eight months before I saw him. He gained altogether 26 pounds. All his physical signs cleared up. His fever disappeared. His appetite became good. He had no night sweats and felt well.

CASE VII.—CASE I. OF FAR ADVANCED PHTHISIS.

Sc., aged 25, had cough and expectoration for two years, also night sweats, much dyspnoea, poor appetite, frequent attacks of vomiting and had lost flesh. A good-sized cavity was present in the left supra and

infraclavicular regions. He began to improve in cough, expectoration, dyspnoea, night sweats, vomiting, appetite and physical signs after the 1st injection. He gained altogether 16 pounds from Sept. 8, 1899, to Jan. 25, 1900. On the former date, his weight was 117½ lbs.; on the latter, 134 lbs. He received nine injections during that time.

DISCUSSION.

DR. W. S. STEWART asked Dr. Mays how many, if any, of these patients showed a predisposition through heredity to consumption, and in how many cases was it acquired by exposure?

DR. F. SAVARY PEARCE asked what evidence Dr. Mays had of the previous weights of the patients exhibited. One examining their physical signs now, one only learned their present condition. A *comparative* weight index would be the most important single record to indicate improvement.

DR. MAYS in reply to Dr. Stewart's question said some of the patients had phthisis in their families, but he did not know how strong the predisposition was in all the patients. In answer to the question of Dr. Pearce, he said he knew nothing of the previous weights except in the case of the colored man who was in the hospital, and who had lost one pound in the four days preceding the first injection and who gained one pound in the four following days, and began to gain in flesh from that time on. Every patient that improves from the injections does not gain in weight. The gross gain in such cases is in the improvement of the general condition. The inference however is safe that the injections increase the flesh in very many cases.

Copy Formula on Label.

By B. FRANKLIN STAHL, M.D.

[Read February 14, 1900.]

It may seem scarcely worthy of the consideration of the members of this society to seriously listen to a paper suggesting a subject of individual preference, and one whose possible merits have been so long known and so little appreciated. The mere neglect, however, of a given method does not necessarily prove its uselessness.

The fact that certain men, who have been and who are accepted as leaders in the scientific practice of medicine, have found the plan of having a copy of the formula accompany the directions to the patient to be a good one, would justify us in seeking for some reason for the infrequent use of the advantage derived from having a copy of the

prescription readily available when one would compare the therapeutic effects produced with the medicine administered.

My experience as a druggist makes me perfectly familiar with the fact that prescriptions bearing the request for a copy of the formula are less welcome in the prescription department than are those entailing less clerical effort. This coupled with the fact that a large percentage of the prescription blanks used are furnished to the physicians gratuitously, and that the druggist who supplies the blank does not furnish one having this direction upon it, it seems to me, furnished an explanation why the request for a copy of the prescription is absent from a large number of the prescriptions compounded. Furthermore, it is not difficult to appreciate that many physicians would be very glad to have a copy of the formula accompany the medicine, but neglect or decline to take the time required to write the request for a copy upon the prescriptions they have written.

In the statements made, I assume that I have explained why a large number of physicians do not have a copy of the formula accompany the compounded prescription. It is a safe assumption that most physicians keep notes of the cases seen in their offices, and a large number make a record of the ingredients and dosage of the remedies prescribed. The advantage and satisfaction of this method require no extended comment at this time. The completed picture furnished by the record of the physical signs and symptoms followed by the medical treatment and the subsequent results, is a sufficient aid to our studies in therapeutics to justify the expenditure of the time required in making the notes suggested. Then again, the plan enables us to discontinue certain drug combinations that have been found unsuited to certain cases.

When we contrast this care in the study of the patients who are able to come to our offices, with the less accurate methods pursued in the treatment of the patients who are confined to the house, I feel that the plan pursued in the treatment of the bedfast cases is so neglectful that we are not justified in disregarding a simple method, that will aid us in a more systematic study of a given case. In a case of acute illness, even where we have the advantage of the services of a trained nurse, her records will not compensate for the absence of the knowledge of the drugs administered, or enable us to adjust the dosage of our remedies to the symptoms and effects produced. The difficulties are certainly increased in a case seen infrequently or where some of the visits are made to the office and others are made at the home of the patient. It certainly is not good practice to give more detailed attention to the walking patient than we are willing to extend to the bedfast case or to

the invalid confined to the house. I do not consider the possibility of making bedside notes of a patient, because the entire absence of the practice among men seeing many patients, stamps it as an impractical method. In the plan suggested, I see the most available substitute for bedside notes to be in allowing the therapeutic measures adopted to indicate the progress of the disease.

The physician who has had training as a pharmacist may reasonably hope to recognize and identify the various preparations of the pharmacopœia, but it is too much to expect him to have an analytical sense of taste or smell, or to be able to remember the ingredients and dosage of the combinations he is apt to prescribe. The practitioner of medicine who has been less intimately trained in recognizing the various preparations and compounds may not hope to be more successful. The limitations indicated in these remarks would suggest the utter impossibility of any physician remembering or knowing the ingredients of prescriptions written at various periods, and thus he is unable to adjust the drug and dosage to meet the indications that arise in the course of a given case of disease.

If I have established the fact that it is desirable to have the copy of the formula accompany certain medicines, then it is in order to inquire what are the possible objections to the method, that would prevent its extended adoption.

From the standpoint of the physician, the plan is open to the objection 1st., that it may unduly familiarize the patient with the drugs employed in the treatment of diseases; 2nd., that it could easily develop in the patient a preference to, or objection against, certain remedies; 3rd., that it could favor the habit of using familiar prescriptions for recurring symptoms; 4th., that it lends itself to the practice of loaning a remedy that has been found efficacious; and 5th., that unless the officinal names used were sufficiently abbreviated on the copy supplied, it might make it dangerous to employ the method when narcotics were prescribed. Some of these objections would have more force, if it were recommended that the copy be placed upon all the remedies prescribed.

From the standpoint of the pharmacist: The plan may be opposed because of 1st., the extra clerical work entailed; 2nd., the tendency it might encourage in certain persons to seek a lower rate when having a prescription refilled. The first of these objections, I hold, should receive no consideration, because the man who has graduated at the Philadelphia College of Pharmacy has been taught that "Pharmacy is the handmaid of Medicine," and I feel that we are entirely justified in looking

to the druggist for any aid he can lend us in practicing medicine on a basis that is more scientific than that represented in handing to the patient of a number of tablets designated by the manufacturer's title or number. While I have always recognized the right of a pharmacist to any patronage he is able to attract to his store, yet I should not hesitate in the least to discriminate against the druggist who persistently disregarded my request that he should copy the formula on the label. The second objection that might be urged by the druggist should be met by the druggist himself. If he is satisfied with a reasonable charge, and secures a reputation for high-grade drugs and fair dealing, the danger of loss due to the customer shopping with his prescription will be more than compensated for by the increased loyalty of the physician.

There is one additional small but practical point, namely, the placing of the copy of the prescription. I hold that it will attract the eye of the patient less persistently if the copy is placed on the back of the bottle, rather than on the same label on which the directions for taking the medicine are written. In the case of a box being the container, the inside of the lid is a place where the copy will be least noticed.

Finally, I desire to make clear the point that I do not regard it as necessary or desirable to place the copy upon all medicines ordered. And that it is easier to run the pen through the line directing that a copy be made, than it is to write the request; and at the same time I would urge that we should not carelessly impose this task upon the pharmacist.

I feel that a more extended adoption of the plan suggested will result in greater care in prescribing and better results in our methods of treatment.

DISCUSSION.

PROFESSOR JOSEPH P. REMINGTON said he was glad this subject was before the County Medical Society as it had been discussed by the American Pharmaceutical Association, and informally by the Philadelphia College of Pharmacy.

There is truly a growing tendency among physicians to request that a copy of the prescription be put upon the bottle or container. The paper answered this question fully and was fair in its treatment of the subject, which, however, ought to be considered further. Some of the objections raised by the author will be found in actual practice to be of more account than any advantages that may result from copying the formula on the label. First, it will familiarize the patient with remedies. Physicians do not as fully realize, as do pharmacists, what this means practically. The more exact, technical, and accurate is the information given to patients, the worse it is for the practice of medicine, and possibly the better for the practice of

pharmacy. A few years ago, the editor of a newspaper wrote an article advocating that all medicines ordered by physicians should be prescribed in the English language and based his remarks upon the statement of a friend, who, being an American citizen, claimed the right to know what he put into his stomach and so was much incensed because the doctor had written a prescription in Latin, which he did not understand. A bill, with severe penalties for its infringement, was introduced into the legislature for the purpose of compelling physicians to write prescriptions in English and pharmacists to copy them in English on the box or bottle. The dangers of using the English language in prescriptions is apparent. Cases with fatal results following its employment could be cited. Professor Remington convinced the editor that the obligations of this law would also extend to the manufacturers of compound and proprietary medicines. Their secrets would be published, their business lapse and the newspaper would get no advertisements. The editor decided to "pigeon-hole the bill."

Is it a wise thing to educate the public in the use of medicines? Where proprietary medicines are prescribed, a practice which is becoming more frequent, it reacts badly. In one instance, *Pepto-Mangan* ("Gude") was prescribed. The pharmacist was obliged to copy on the label "*Pepto-Mangan (Gude)*;" "take a teaspoonful three times a day." The patient improved, renewed the medicine at will, never went near the doctor, and—got well.

The order to copy the formula on the label, probably, often arises from a disposition to avoid the keeping of careful notes in one's mind. The carbon prescription books are the safest and by far the best, means of meeting this question, and, in addition, they furnish evidence in case of a mistake on the part of the apothecary. Mistakes are liable to occur on both sides, and therefore every precaution should be taken. The pharmacist would not object much to putting the formula on the label, because it would permit prescriptions being filled by different pharmacists, since the competition is now so great, with regard to prices for prescriptions, that there is a general rate charged, and, while some people try to get a prescription filled for a few cents less, the custom is not nearly as prevalent as it was. Enormous prices are no longer charged. It will not be found that pharmacists, as a rule, are unwilling to copy the formula. The teaching at the Philadelphia College of Pharmacy is always in the direction of obeying a physician's orders in compounding prescriptions and there is no defence for any pharmacist, who does not do so when ordered, unless a mistake has been made by the physician.

DR. MARY E. ALLEN inquired what the druggist would do if the patient asked for a copy of the prescription when the doctor had not directed that it should be given, or had requested that it should not be copied.

DR. F. R. SLARKEY from his own experience and a financial standpoint said it would be very disastrous to have the formula copied on the bottle. Some patients believe they cannot take certain drugs. He mentioned in illustration that a patient objected to strychnin in a prescription, and

although she was assured that it was not poisonous in the dose prescribed for her, she went away and never came back. Another woman told him that she could not take quinin. Yet several times he prescribed it without her knowledge, and she took it with no ill effect.

DR. W. S. STEWART pleaded guilty to writing "Copy the formula on the label," for over twenty-five years, and said he had not yet regretted it in any one instance. He had a little more difficulty in having it done than suggested by Professor Remington. He was obliged frequently to write to druggists, that, if they would not copy the formula, he would have to send elsewhere. He had found the formula on the label a great advantage. His patients had confidence that the prescriptions were accurate and did not hesitate to take them. The method advocated facilitates the detection of mistakes and has saved his patients from taking medicines that were sometimes too strong. One cannot always carry notes and by having the prescription at hand on the label when the patient is seen, much time is saved with advantage to the doctor as well as the patient. In prescribing poison, the formula should be put on the label, and the patient should be informed that the prescription contains poison and warned of the symptoms indicating an overdose. A patient for whom Dr. Stewart had prescribed Fowler's solution, and who had been warned of its being poison, took a teaspoonful of it in mistake for another medicine. Having taken it, she looked at the bottle, knew what she had taken, and sent for Dr. Stewart who was at the County Medical Society where Dr. H. H. Smith was then condemning the practice of allowing patients to know what their prescriptions were, saying that a patient finding that he had been giving her Fowler's solution declined to take it. In conclusion, Dr. Stewart commended the paper, but took exception to the advice of Professor Remington.

DR. RACHEL S. SKIDELSKY said that in obstetric cases it was her custom in ordering creoline and ergot to request that the formula be put on the label with the directions. This prevents remedies that look alike from being mistaken for each other in moments of hurry. She added that she had never found the druggist to fail in doing as requested.

DR. F. SAVARY PEARCE said that as even the presumably most intelligent persons may be erratic in their ideas regarding "medicine," the advisability of copying the formula depends largely upon the study of the individual case.

DR. L. F. FLICK was favorably impressed with the idea of having the formula on the label and asked Dr. Stahl and Professor Remington to what extent the right, which he believed the physician possessed, of vetoing the renewal of the prescription, is legally affected by having the formula written on the bottle. As a profession, physicians should oppose the renewal of prescriptions, particularly those containing alcohol and opiates.

PROFESSOR REMINGTON repeated his belief that if, as a general practice, the prescriptions were put on the label, it would greatly tend to self-medication and injure the practice of medicine. He urged that the confidential relations between the physician and the pharmacist should be kept there

and that everything should be done to increase that confidence. In answer to Dr. Allen he said that when a patient asks for a copy of a prescription the druggist is bound to give it. He may say that the patient can get a copy from the physician, but the reply may be, "I paid my bill to the physician; the prescription is mine." In Europe, the apothecary is obliged to give a copy. In this country, it is not customary to do so unless it is demanded. The druggist does not always want to give it, but he has no legal right to withhold it.

DR. ELIZABETH R. BUNDY related that a physician, whom she knew, had been told by a druggist that a certain prescription written by the physician had been renewed so often as to be worth \$300 to the druggist. In another instance a family and the friends of that family had made extensive use of a prescription, the principal ingredient of which was morphia. It always gave them an excellent night's sleep and stopped the cough.

DR. FLICK said that his question had not yet been answered by Professor Remington.

PROFESSOR REMINGTON replied that the question of the proprietorship of a prescription is not yet settled in all of the United States; it is in a few. A jury would decide that the prescription belonged to the patient because he had given value for it. The request, "Prescription not to be renewed without special order," Professor Remington never knew to be disregarded, and he thought that if it could be proved that a pharmacist had renewed a prescription for morphine contrary to directions, the latter might be liable for damages. The formula on the label does not waive the right of the physician to forbid the renewal of a prescription, because the physician has no right that he can enforce. The patient's rights to the prescription are superior to those of the physician or of the pharmacist, and if the patient demands the prescription, it is to the advantage of the pharmacist to heed the request. On the other hand, every properly educated pharmacist of common business sense, would certainly regard the request of the physician not to renew the prescription.

DR. W. S. STEWART suggested that the man who ran the risk of taking what was not recommended by a physician or who was guided by "behind the counter advice" was probably unable to pay for a prescription and in consequence was an undesirable patient.

DR. STAHL in closing the discussion said he thought it had invited attention to a practice which was evidently in disfavor with some members of the Society. He was willing to have his patients know what was in their prescriptions, and they could shop and get rates if they so desired. In certain instances, the formula on the label serves to indicate the physical condition of the patient and the therapeutic need. The sight of the combination of drugs written for and adapted to a patient's condition presents a picture of his condition at the time the prescription was written, but the symptoms may have so changed that one of the ingredients, instead of a combination, will now suffice. The physician desires to know the various ingredients and the doses as administered; if giving a sixtieth of strychnia to-day he may

wish to give a thirtieth next week. Extreme abbreviation on the label is desirable. The carbon copy method suggested by one of the speakers would not avail if the prescription were a year old because it would either be lost or stored in the office and the preparation of the necessary index of the carbon prescription is more than could be expected of a busy man.

The question of Dr. Flick finds its answer in the supposition that if the compounder of the prescription refuses to renew it, the patient will apply at another drug store and the prohibition to renewal is thus waived. A pharmacist advised by a lawyer has refused to give a copy of, or to renew a prescription requested by a patient, because, the doctor, who wrote the prescription, had requested that it should not be done. The authority of Professor Remington on this subject was acknowledged, but the instance quoted was vouched for. The fact that the prescription is not copied will not prevent the habit of loaning prescriptions and of shopping. Patients have been known to loan the bottle and copied prescriptions, and the speaker was proud to say that certain druggists refused to repeat such prescriptions, because they were not the property of the one presenting them.

Rupture of the Plantaris Muscle (Lawn-Tennis Leg or Coup de Fouet).

BY JOHN H. GIBBON, M.D.

[Read February 14, 1900.]

The case I report is that of a gentleman aged 38 years who presented himself at my office on the 7th of last September, giving the following interesting and typical history :

On the day previous, while playing tennis, he was suddenly seized with a sharp pain in the calf of the left leg, followed by such weakness and pain upon locomotion that he was obliged to leave the court. He described the sensation as that of being struck upon the leg, and with this idea in mind he looked around to see who had struck him, supposing it to have been his young nephew who was playing near the tennis court. The subsequent pain was not very great, excepting when he tried to walk. This he could only accomplish with the ankle held stiff and the toes turned out. The day following the injury, when I saw him, he walked with great difficulty using a cane and keeping the injured leg stiff; the toes were much everted. When at rest, the part gave him no pain.

Upon examination of the leg, I found the skin over the calf tense, and there was a very tender spot over the middle of the calf muscles; it was here that the patient definitely located all his pain. Measurement

showed the circumference of the injured leg to be 1 inch greater than that of the opposite side. There was no ecchymosis present at the seat of injury or below it, but at the point of pain there could be felt a distinct, deep induration. With the history and these local signs, I made a diagnosis of rupture of the plantaris muscle, and applied ichthyl ointment and a firm bandage from the toes to the knee, after which he was more comfortable and walked with less limp. He went to his office in a cab for the two subsequent days, spending much of his time with his foot elevated, and did no walking. On the third day, however, his leg was so painful that he was quite ready to go to bed and give the part absolute rest. At this time, there was slight swelling above the ankle and extensive ecchymosis both over the seat of the injury and below it. The part was kept firmly bandaged, and daily inunctions of ichthyl ointment were made. At the end of about a week the patient was up and moving about with a cane, the ankle was still held stiff and the toes everted. Any attempt to turn the toes in and to extend the foot gave rise to pain. A Randolph elastic bandage and daily massage were now prescribed. Within a few weeks the patient could walk without a cane. The tenderness and induration disappeared, and the function of the joint was entirely restored. The circumference of the injured leg a month or two after the injury, was the same as that of the other leg.

This case illustrates so typically the symptoms and course of a ruptured plantaris that I thought it worthy of record. The description of the injury is not new, the French having described it in the early part of the century under the name of *coup de fouet* (blow of the whip). The English called it lawn-tennis leg. Probably the most distinguished sufferer from the ailment was Cardinal Richelieu, but the particular game he was playing is not recorded. The name lawn-tennis leg is a bad one, because, in the majority of cases, the injury was not received at this sport, but, in many instances, occurred when the patient was walking, making a particular step, mounting a bicycle or horse, or using the limb in some other ordinary way. The cause of the injury is the most difficult part of the question and probably the most interesting. It certainly cannot be attributed to excessive muscular strain, because in none of the cases is it recorded that the calf muscles were doing any more than their ordinary duty. A tendency to obesity has been advanced as a cause, as the patient has often been quite stout. Muscular tire has been suggested and is plausible enough when the histories of the reported cases are studied; to find that it has occurred after a long walk or hunt, or after excessive exercise is not infrequent, in my own case the patient was not in particularly good condition, from an athletic point of

view, and had played tennis on the day previous to the injury until he was "stiff and tired."

Terillon thinks much of the trouble is due to rupture of deep varicose veins. As we have no post-mortem examination following this injury, its pathology must remain somewhat indefinite. The earlier cases were reported as ruptures of a portion of the gastrocnemius, but a rupture of this muscle could be detected by feeling a separation at the seat of injury. I am inclined, however, to the belief that in those severe cases in which pain and swelling are great and continued, and in which the patient's recovery is not complete for months, such as have frequently been reported, that a more extensive injury to muscular tissue has occurred than a separation of the plantaris from its tendon. In these cases, unless there is evidence of an injury to the gastrocnemius, I should suspect that there had also been some laceration of the deeper calf muscles; or perhaps the trouble may be attributed, as suggested by Terillon, to a varicosity of the deep bloodvessels.

The symptoms, in nearly all reported cases, are very much the same as those complained of in my case, a sudden pain about the middle of the calf, where the muscle joins its tendon, as if one had received a blow; inability, because of pain, to walk except with the part held stiff and the toes everted; swelling; later, severe pain and ecchymosis. Physicians are not immune from this injury, McDonald of Chicago reports his own case, as does Dr. Don of the English army, and Dr. Allis of this city tells me he has suffered from it. The left leg, strange to say, is the one most frequently injured in this way, although I have found several cases in which the plantaris of each side was ruptured on different occasions. The treatment consists in immediate rest and moderate compression with, later, massage and an elastic bandage. Judson recommends as a very comfortable aid to locomotion in the severer cases, a high-heeled shoe. I believe that to put legs thus injured up in a fixed dressing, like plaster of Paris, except where it can be demonstrated that one of the large muscles of the calf is ruptured, is not only unnecessary, but, less apt to give good results than when the leg is elevated with moderate compression and later treated by massage. The fixed dressing permits adhesions to take place and the exuded blood is not so readily absorbed. The open-work elastic bandage I find is cheaper and more comfortable and in every way as effective as the solid rubber bandage or elastic stocking, the solid rubber is hot and often produces an irritation of the skin; the elastic stocking when it becomes worn out at any one spot is useless. In my dispensary work I invariably recommend the elastic bandage wherever I want compression of the part.

BIBLIOGRAPHY.

- Judson : New York Medical Journal, 1881, p. 40.
Powell : London Lancet, 1883, No. 2, p. 44.
Morton : Indian Medical Gazette, 1887, xxii. p. 330.
Platt : Boston Medical and Surgical Journal, April 20, 1893.
Nichols : Boston Medical and Surgical Journal, August 22, 1878.
Don : London Lancet, 1883, No. 2, p. 946.

DISCUSSION.

DR. G. G. DAVIS said that although this affection itself is well known, its pathology is not so positively known, and while a rupture of the plantaris may be diagnosed it is done by reasoning not entirely convincing. It may be possible that some of the fibres of the other muscles beside the plantaris may be ruptured. If asked to give a guess as to the cause of the affection, he would offer the vascular theory. Supposing the ascent of the blood in the veins was checked by their being compressed by the contracting muscle, this might cause a rupture which would account for the swelling, ecchymosis and other symptoms. He has seen effusions in the leg which appear to have come from this cause—a rupture of the veins—and he believes the deep veins of the leg can rupture as well as the superficial veins. He did not say that the plantaris muscle is not ruptured, but until it is demonstrated in an individual who has died soon after suffering this injury, the absolute cause will not be known.

DR. ELIZABETH R. BUNDY asked if the passive extension of the limb caused as much pain as did extension performed by the patient. From the position of the many small muscles which lie directly under the belly of the plantaris, it would seem quite possible that a little extra tension produced here would not be felt so much upon the plantaris. At the same time the vessels might be easily ruptured by that special tension.

DR. GIBBON agreed with Dr. Davis that the cause of the condition will remain unknown until its pathology is discovered. The question of Dr. Bundy received the answer that passive extension produces just as much pain as if the patients themselves extend the limbs. Although some confusion might arise in diagnosing between a rupture of the plantaris and a rupture of the soleus, there would seem to be little difficulty in differentiating between the gastrocnemius and the plantaris, since the former is superficial. Its insertion with its tendon, the usual seat of rupture in any muscle, can readily be felt and the effusion of blood would be superficial; whereas, in rupture of the plantaris, the effusion is deep and it would not show for several days, and the pain would be felt above the line of the insertion of the gastrocnemius into its tendon.

Siphonage of the Partitioned Bladder for the Individual Kidney Urines.

A New Instrument. The Separate-Urines-Siphon.

BY ANDREW J. DOWNES, A.M., M.D.

[Read February 27, 1900.]

Renal surgery, so great has been its progress, that, though scarcely more than twenty years old, it has now but one requisite to make it nearly ideal, namely, an easy, harmless, painless, and practical method of obtaining the individual kidney urine. With the advent of ureteral catheterization, so successfully performed by Kelly and others, it seemed that individual kidney action, especially in the female, would not be often an unknown quantity, yet the proportion of cases in which study of the individual kidney urine precedes renal surgery, even in the female, is quite small. In the male, who requires kidney surgery as often as the female, the separate kidney action, prior to the introduction of the Harris Urine Segregator, was not obtained, all told, in one hundred individuals. Corresponding to the lack of attention to this preliminary and unquestionably necessary detail, has renal surgery been more or less unscientific and faulty.

Catheterization of the ureters in the female through the air-distended bladder and in the male through the catheterizing cystoscope does not solve the problem. My experience teaches me that such catheterization is not simple work, and this agrees with the observation and experience of many others. It is distressing to the patient and not free from danger of fresh kidney lesions. It certainly has indications such as sounding the ureter for stricture or stone, detecting stone in the pelvis of the kidney, setting up artificial renal colic for diagnostic purposes as advocated by Kelly, and other uses, but, for obtaining the individual kidney urine, it must be supplanted by a more practical procedure.

The most practical and useful method, up to the present time, for obtaining individual kidney urine has been by means of the Harris Urine Segregator, so-called. Not a few surgeons of large experience, who had not catheterized the ureters, did succeed in obtaining the separate urines by means of this device. In the short period that has elapsed since its introduction, notwithstanding its imperfections, an increasingly large number of cases of renal surgery have had through its use, the individual kidney action studied as a most useful preliminary measure.

I began the use of the Harris Urine Segregator early in 1899 and have

had a varied experience. In one case I used it ten times prior to a nephrectomy for advanced tubercular disease of the left kidney and through its use succeeded in finding a time when the other kidney, itself diseased, was doing work sufficient to warrant the removal of its mate, which was so badly involved as to only secrete 0.3% of urea. The remaining kidney, prior to operation, was secreting urine practically normal in reaction, quantity, specific gravity, and urea. On boiling, fully one third of the bulk of this urine was made up of albumin, no casts were found. As a result of the operation the patient gained thirty pounds in three months. The operation and results were due to the fact that the urines could be obtained so often and in such quantity as to select a proper time for operating.

In a case of pronounced floating kidney, with marked unilateral pain, a study of the urine obtained by this device made me decide on nephrofixation, in spite of the fact that the capsule was very much thickened, adherent, and contained numerous white patches that might lead one to the diagnosis of tubercular kidney.

Another case, a male of forty years, had suffered from calculous nephritis since 1884, and in June, 1899, had a perinephritic abscess which ruptured through the diaphragm and then refilled. I opened this abscess in the loins while the patient was almost moribund. Subsequently an X ray confirmed the diagnosis of a very large calculus. With this history, the necessity of knowing the individual kidney action was essential. I succeeded in using the Harris Urine Segregator with the assistance of bromide of ethyl and obtained, in one hour, from the left kidney one drachm of pale, watery, purulent urine, containing 0.6% of urea, while, at the same time, the right kidney passed 2½ ounces of pale, amber urine, with a specific gravity of 1008, and containing 1% of urea. The indications were against nephrectomy. On operation, a greatly enlarged pus-distended kidney was found having its pelvis filled by a large mass of small calculi, almost completely blocking the ureter. Notwithstanding pyurea, the patient is in better health than for years and living, perhaps, because I did not do a nephrectomy.

In another case, I obtained 3 ounces of bloody urine from one side and 2½ ounces of light colored urine from the other without the admixture of any blood, as evidenced by the microscope.

In many other cases I have used a Harris Segregator and in all of them I have obtained a positive separation of the urine. Yet, with increasing experience, I found it an imperfect instrument. Its use is distressing to the patient. One can very easily make a mistake and lose the separation so that an admixture is obtained. It is complicated in

so much as it requires suction apparatus. Its calibre is too large. Mistaken adjustment of the apparatus may cause temporary occlusion of a ureter as in one case where I obtained no urine from one side for thirty minutes. Coincident with non-appearance of fluid from the right side, there was pain of increasing severity in the right renal region. After the lapse of thirty minutes a readjustment of the apparatus freed the right ureter and I had as much urine from the right side as had already been passed from the left. Other objections might be cited. During the use of the segregator I one day found to my agreeable surprise that the suction apparatus could partly be dispensed with and the instrument be used as a siphon. It is, however, an extremely imperfect instrument to use in this manner, and its success when so used is probably accidental. I decided to make, if possible, a separate-urines-siphon that would discharge urine from the partitioned halves of the bladder, practically from the mouths of the ureters and at the rate that the urine enters the bladder. Delivered thus, without any suction other than siphonage, the urines, coming into contact with an extremely small portion of the bladder wall, are practically free from bladder contamination especially if we first wash the bladder as a whole and then each half before collecting urines.

The instrument I advocate is made of two parts, a double barrelled, bifurcating catheter of small calibre (13 American scale) and a partition rod which elevates the bladder wall between the catheter ends for fully two and a half inches. The partition rod differs for the sexes and is attached to the end of the shank of the catheter by a small fixed clamp and thumbscrew. The properly selected position of the partitioning rods is maintained by tightening the screw. The urines enter the instrument through the small openings in the sides of the dilated ends of the beaks. Each beak has only one opening, and each opening is either immersed or, with the removal of fluid, is closed through siphon suction on the bladder wall, which, therefore, acts as a valve intermittently opening when the ureters have emitted sufficient urine to lift off or displace the valve acting mucous membrane of the bladder in direct contact with the small opening in the beak. Intermittent siphonage will thus continue indefinitely while the instrument is in place. Movement of the beaks during the introduction of the instrument into the bladder is prevented by a little fixation pin. The technic of using this instrument is as follows: The bladder is thoroughly irrigated and then half filled. The double catheter is then introduced, the outer ends being closed, so that the bladder cannot empty. The beaks are turned to rest horizontally on the floor

of the bladder which is now allowed to empty. The partition rod is then introduced into the vagina, or in the rectum in males, and attached loosely to the clamp. The left hand approximates the shafts of the catheter and partition rod, while at the same time the beaks are turned downwards, each into its own sulcus in the sides of the bladder formed by the partition. With the beaks turned into the sulci, the shafts of the catheter and the partition are brought as close together as possible without producing pain. At this point, the clamp is fixed by turning the thumbscrew. The individual halves of the bladder are now washed out. Urine will follow the irrigating fluid. The flow is allowed to proceed uncollected for a few minutes until we are sure undiluted urine is passing. Then the flasks are placed into position under the siphoning ends and the urine collected. The siphon catheter should emerge from the bladder on the level, or better, with a slight ascent and the ends should be below the level of the beaks in the bladder to assure siphonage. For maintaining the proper level of the catheter a simple stand with a sliding rod is of use.

As the instrument will naturally be compared with the Harris Segregator the following differences will be noted: A much smaller caliber as a whole. A simpler curve at the beak end. A longer and more certain bladder partition. One definite fixed relation between the beaks and the partitioning medium. The absence of all unnecessary suction apparatus. The absence of a spring for elevating the partition. The introduction of a new feature, siphonage alone, for the withdrawal of the individual kidney urine.

This instrument was first used February 6, 1900, on a male, sixty years old, who had a moderate degree of enlargement of the prostate gland, as evidenced by rectal examination and the presence of one ounce of purulent residual urine. This patient, some years ago, had a stone crushed in his bladder. Four years ago he had nephrotomy performed for pus in his left kidney. I obtained his individual urines with little or no distress to him during thirty-five minutes. Ten days before using this instrument, I had failed to enter his bladder with an instrument of the same calibre as the Harris Segregator. It was the ease with which the siphon was used and the individual urines obtained from this patient, from whom by no other known instrument it could have been obtained, that caused me to continue the simplification of the instrument. The further step in the improvement that I am now demonstrating, was used in four women in St. Mary's Hospital last week. They were new cases applying to my service for diagnosis. Without preliminary preparation, each patient was placed upon the examination

table, the bladder irrigated and the siphon used for one hour without complaint and without subsequent distress. Subsequent irritability at the vesical neck noticed in most patients after the use of the Harris instrument did not occur in these cases. One of these patients was two months pregnant, another septic from retained secundines. In each case the separation was proven after the collection of sufficient urine by the introduction of a small amount of methylene blue solution into one side of the bladder. The urine from this side for a brief period came blue without any stain whatever on the other side.

EXHIBITION OF INSTRUMENT.

I have made the partition, which separates the bladder into halves, a little over twice as long as the one used by Harris. The spring for making pressure, present in the Harris instrument, I do not consider necessary. I have delivered urine intermittently from the two sulci, practically, as it enters the bladder from the ureters. In a man 60 years of age I have obtained separate kidney urine. This is hard to achieve at such an age. There is no reason, however, why there should be this difficulty if the instrument is not too painful. Heretofore, I have had to cocaineize the bladder to obtain the urines, but, with this instrument this has not been necessary.

DISCUSSION.

DR. H. M. CHRISTIAN said this matter of collecting, separately, the urine from each kidney was one that in the past year or two had attracted considerable attention from genito-urinary surgeons. The ideal instrument for this purpose is undoubtedly some form of a catheterizing cystoscope. The great danger of such instruments, as are constructed at present for this purpose, are traumatism to some portion of the ureter, and the danger of infecting a healthy kidney. A minor objection to the catheterizing cystoscope, and yet, one that has some weight, is the great difficulty in acquiring sufficient skill to carry out the steps of the operation successfully. Dr. Christian has had considerable experience in the use of the Harris urine segregator and, in the main, has found it to give fairly satisfactory results. The chief difficulty in the use of this instrument is found in cases in which there is marked cystitis; here, the use of the urine segregator causes considerable pain and an increase of the infectious process. The instrument, as modified by Dr. Downes, and that night presented by him, has some distinct advantages over the Harris instrument; namely, lightness in weight, a smaller caliber for the catheters, and a longer partition in the bladder wall. Dr. Christian would be glad of an opportunity to try the modification of the Harris segregator.

DR. WM. LOUIS RODMAN said he was favorably impressed with the paper and demonstration of Dr. Downes, and thought the instrument an advance

on that of Harris inasmuch as it can be introduced with greater facility, gave less pain, and he had no doubt would siphon urine as had been stated by Dr. Downes.

DR. DOWNES said he had often thought of the points made by Dr. Christian, but always had been impressed that specific gravity, quantity, reaction, and urea were the things absolutely necessary to be known of urine. Knowledge of kidney action is essential, when it is a question of whether a man should lose his kidney. Whatever the bladder might say, this can be decided, if the partition can be proven. A much better partition is obtained by this instrument than by that of Dr. Harris. In all cases where Dr. Downes had used his instrument he has proven the separation. He always is obliged to use the cocaine with the Harris instrument and it always distresses the patient owing to its thickness, and because the partition crowds everything in the vesical neck.

Report of the Committee on a Private Pay Hospital for Contagious Diseases.

BY J. MADISON TAYLOR, M.D.

[Read February 27, 1900]

The committee appointed to secure a hospital for the treatment of contagious diseases (where those who are able and willing to pay for suitable accommodations may be attended by their own physicians) beg leave to report progress. In the spring of 1899, the committee wished to learn how far the physicians of Philadelphia desired and would support such an institution. They sent out inquiries on double postal cards to 2900 physicians, requesting immediate reply on the return card. To these, only about 400 answers came back, most of which were favorable, and a few—about a dozen—were doubtful, and five opposed the idea on one or another untenable, irrelevant ground. A large number did not reply at all, and among them were many prominent men who have been seen personally and readily admitted that their omission was one of mere thoughtlessness, and that they fully endorsed this measure. The result of this effort shows conclusively that physicians are extraordinarily indifferent, to a measure, which, if they would take the trouble to give it their attention and support, could only redound to their individual advantage, as well as to that of their clients. If this matter can only be brought sharply to their consciousness, it will not only be approved of, but they will be eager to make use of such a hospital, as the constitution provides that in this hospital, any legally qualified medical practitioner, may attend his or her own patients. It is not necessary, here,

to reiterate the enormous advantage of such specially provided accommodations, with trained nurses, willing and accustomed to attending contagious maladies; ready, at hand, to receive patients who have not suitable homes, yet are desirous of being isolated, and who are compelled to leave hotels, apartments and boarding houses. The public are naturally indifferent to what seems always a remote possibility for persons of comfortable means, and it remains largely for the physicians to appreciate the pressing need for comfortable places to which people may be removed, in the event of such diseases attacking them, and especially now that the municipal law is increasingly strict in the regulation, guardianship and isolation of contagious diseases, not only in places of public residence but also in private dwellings.

It should be noted, too, that the rules of this hospital differ from those of public institutions, so liberally provided in Philadelphia, in that entering it does not involve placing the sufferers under the care of the House Staff, hence out of the jurisdiction of their own medical adviser, but the patients remain under the guidance of the physician of their choice. Thus a double privilege is here enjoyed by both physician and patient, and should be recognized and appreciated. We have to express our surprise that these points, and indeed the whole project, has obtained practically no recognition at the hands of the medical profession, to whom most of the material advantages would accrue. A few of the laity have recognized its value, and voluntary subscriptions have come at each issue of circulars at various times. A total has thus been collected of about \$1000. There is in the hands of the Treasurer nearly \$5000 most of which has been raised by such co-operative action as:—the Women's Edition of the Press; the Doll Show; and a single large subscription from the Cramp's Shipbuilding Firm.

This Autumn, desiring to obtain an expression of opinion from an authoritative expert source, I wrote a letter to Prof. Alexander C. Abbott, who is head of the City Laboratory of Hygiene and Professor of Hygiene and Bacteriology at the University of Pennsylvania. This letter, and his reply, are submitted at length:

December 9, 1899.

DR. ALEXANDER C. ABBOTT,

MY DEAR DOCTOR ABBOTT:—You are well informed of the efforts that we have been making in the past three years to secure a private hospital for contagious diseases in Philadelphia. You know full well that the glaring defects of our hospital accommodations in Philadelphia is the absence of any place where private patients can be treated for contagious maladies. The only possibility now is the Municipal Hospital, which is unequipped for offer-

ing adequate accommodations to those who are able and willing to pay for even fairly good care.

I wish you would kindly give me an expression of opinion as to the need of such a hospital, which I may make use of. Your voice will be that of an authority, not only as a physician—a Bacteriologist of the highest rank—the chief authority holding official position, in both the University and the Municipality, but also as a man of recognized wisdom in matters of public and private polity.

Yours faithfully,

JOHN MADISON TAYLOR.

UNIVERSITY OF PENNSYLVANIA, LABORATORY OF HYGIENE.

DIRECTOR A. C. ABBOTT, M.D.

PHILADELPHIA, Dec. 12, 1899.

DR. J. MADISON TAYLOR,
1504 Pine St., Phila.

MY DEAR DOCTOR TAYLOR:—Replying to your communication of the 9th inst., permit me to say that it is my belief that few sanitary steps of greater importance could be taken than the organization of a hospital, especially equipped for the treatment of transmissible diseases occurring among the class of the community who are willing and able to go to private hospitals and pay for their accommodation, but who, under no circumstances, would voluntarily go to a public hospital.

Such hospitals would, I believe, prove to be not only of the greatest convenience to physicians, patients, and the families of patients, but what is more important, would be of marked assistance to the municipal health authorities in their efforts to restrain the spread of these maladies.

As the matter now stands, I believe the law prohibits any hospital in the city from knowingly receiving cases of acute transmissible disease. In consequence, these cases must either be managed at their homes, which is inconvenient and not always according to approved sanitary methods, or must be transferred to the wards of the public hospital of the city. As you are aware, the Municipal Hospital is often strained to its utmost capacity in its management of that class of cases that are properly the wards of the city during the period of their illness, namely, cases that cannot be treated at home without menace to the health of those in the immediate vicinity. While the Municipal Hospital has provisions for the accommodation of private or pay patients still this accommodation is very small, and is at present limited to only one disease, namely diphtheria. It is manifest to you, then, that much of the acute transmissible disease occurring among the citizens of Philadelphia and among visitors of the city must of necessity be treated at their homes or in their temporary lodgings, be these boarding houses or hotels, under circumstances that are not, as a rule, most favorable for the prevention of the spread of these diseases. Many patients coming within this category would gladly consent to removal to hospitals, providing accommodations suitable to their tastes and means could be had. Your plan proposes to supply such accommodations, and I am astonished that it has not received more general and hearty support.

From the foregoing it is plain to you where I stand in the matter, and I cannot but believe that your plan, if carried out, will meet with the full approval of the health authorities, because of the aid that it will afford them in the performance of their most important function.

If I might be permitted to make a suggestion, I would recommend that you do not wait until you can begin the work on a scale commensurate with its importance, but begin at the earliest moment in a small way, demonstrate the usefulness of the plan, and its future will take care of itself.

Very truly yours,

A. C. ABBOTT.

PHILADELPHIA, February 28th, 1900.

MY DEAR DR. TAYLOR:—I have all along been heartily with you in your project for establishing a private hospital for contagious diseases. I wish now I had had a little more foresight and sent in a good subscription to aid the work. The experience of the last month, in which I have been turned out of my office by scarlet fever among my own children and a week later out of another physician's office upon his house being placarded for diphtheria, makes me keenly appreciate the importance of such a hospital. The experience has been a costly one not only in its present effects but those reaching far into the future. If I could have sent my children to a nice comfortable hospital, it would undoubtedly have been much to their advantage and have added much to the comfort and safety of everybody and saved me hundreds of dollars.

Yours very cordially,

WALTER J. FREEMAN.

A very valuable suggestion was voluntarily given me by the Rev. Dr. Dickey, President of the Board of Managers of the Presbyterian Hospital. He assured me that such an institution as we had in mind would be of the greatest service, as supplementing the work of the hospitals in the city, and he suggested that the authorities of the various hospitals should be approached, and an endeavor made to secure some arrangements with them, by which they should regularly support one or more beds in this hospital for contagious diseases, so that, if a case should arise in their wards, as often happens, the person might be transferred immediately to suitable accommodations, and where the original malady, as well as the intercurrent one, could be suitably treated. He felt sure that the managers of the Presbyterian Hospital would welcome such an arrangement, and he felt confident that many of the others would be glad of such an opportunity.

A small sum from each hospital, thus guaranteed, would, in the aggregate, be of great assistance to us, and make it possible to maintain in readiness a better quality of administration. After a year or two of such an arrangement it could be more definitely determined how much

use each hospital could be expected to make of this plan, and a sum accordingly fixed.

One of the difficulties met in asking for means to erect a pay hospital for contagious diseases is the fact that it is not, as one must admit, a pure charity. It provides for the comfort of those of moderate or ample means, who, at present, are entirely without such accommodation, which they often and not seldom most urgently need.

In asking for money, objection is met from the very rich person, on the ground that it may be looked upon as a money making scheme. Indeed certain persons have inspected our constitution and by-laws thinking to find this a possible ground for investment. They have one and all rejected the plan on close calculation.

It remains, then, to depend for support upon those who have moderate or ample but not large means and who yet may need the Hospital at any moment for themselves or their families or friends.

We look with confidence upon the medical profession for direct support for the reasons indicated. They will be able to appreciate the advantages offered so soon as it is in running order.

We also expect much co-operation and aid from hotel keepers for obvious reasons.

Meanwhile the matter lags, not because the plan is not clearly of large value but because it is somewhat out of the customary lines of charitable thought. It is a charity, though not an obvious charity for the poorest folk and yet it is a most charitable provision for people in direst need and these may be at any moment our friends, our families or ourselves.

Your committee would respectfully recommend that a resolution be passed, of some strength, endorsing the plan of the committee, in order that physicians, at least of our own county and locality, may realize that the project is a serious one, and of sufficient value to merit co-operation and support. Whenever the realization of this much needed institution is indefinitely postponed it makes it the more difficult to secure a hearing for the promoters.

(The following Resolution was offered and passed without a dissenting voice:)

Whereas there is obvious and urgent need for a Hospital especially adapted to the needs of sufferers from contagious diseases other than the Municipal Hospital. And:

Whereas the subject has long been before the attention of this Society
Resolved: that the Philadelphia County Medical Society urge upon its members and others to encourage and in substantial fashion to assist in securing a pay hospital for contagious diseases for Philadelphia.

DISCUSSION.

DR. J. P. C. GRIFFITH said the need of such a hospital is recognized by all and had been many times felt by him. He asked what amount of money is required. He knew some changes had been made in the original plan; again, would the city permit the erection of a hospital of this nature in the city limits? If so, he favored starting in a small way, an elaborate outfit was not needed for the start, nor was a large corps of nurses. Those required could be employed as needed. The place is what is required.

DR. J. M. TAYLOR said the subject had been presented to the Society in order to elicit inquiries like that of Dr. Griffith. There are many difficulties to the plan of starting in a small way. A recent statute forbids the erection of another hospital within the city limits. On the Board of Directors of the proposed hospital are Judges Ashman, Sulzberger and Beitler. Their joint advice is that if a beginning is made in a small way in almost any locality, nothing could be done to oppose it except by the consensus of public opinion. If a hospital is desired, it could easily be brought about by men of such prominence and influence as the Society contains, either directly or through their rich patients. The sum required is at present estimated at about \$10,000. It is impossible to begin in a small way unless there are sufficient funds to fight local antagonisms. The public is unreasonable and must be educated to know that such an institution would be a safeguard rather than a danger. Dr. Taylor expressed his preference that the matter should not be started in any ill-advised fashion, but rather upon some firm basis and surrounded by safeguards to make it a success. A lot has been acquired and it is intended to immediately build on it two separate buildings of cheap construction, one for scarlet fever and one for diphtheria, each affording about five private rooms. This will test the question of support by the medical profession. If this be sufficiently encouraging, the hospital will speedily be enlarged to the required dimensions.

DR. F. SAVARY PEARCE asked whether any moneys had been offered by the laity and whether any moneys were in hand. He favored an institution for private cases and thought that in the co-operation of the philanthropic public lay the greatest promise of success.

DR. TAYLOR said about five thousand dollars were in hand, and that he had received many tentative promises.

DR. JAY F. SCHAMBERG said the project was one of great importance and was worthy of the hearty support of all physicians. He had seen people, who, otherwise, would have been cared for in a pay hospital confined with diphtheria, scarlet fever, and small pox in the Municipal Hospital. A brother-in-law of a physician of this city afflicted with small pox several years ago, was obliged to lie in the general ward of the Municipal Hospital with only the privacy afforded by a screen about his bed. The emanations arising from 40 or 50 other small pox cases could not have been but obnoxious to him. One never knows when the need of such an institution will be greatest, and the experience of this gentleman should appeal to all.

A hospital for infectious diseases should of necessity be built upon the pavilion system, and there should be a sufficient number of separate buildings to provide for the various infectious diseases. He could see no objections, except possibly the price of the ground, why such an institution should not be erected in the immediate vicinity of the Municipal Hospital. The recent attempt to remove the Municipal Hospital from its present location was largely organized by individuals having a speculative interest in the surrounding real estate. The hospital is not a source of danger to the neighboring homes, for as an actual matter of statistics there are less infectious diseases in this quarter than elsewhere in the city. If the hospital were, as proposed, removed to the outlying precincts of the city, the long ambulance drives would doubtless prove disastrous to some of the desperately ill little ones. Physicians should therefore use their influence to prevent the removal of the Municipal Hospital. Philadelphia is behind many of the larger cities in the establishment of a pay hospital for infectious diseases. In conclusion, Dr. Schamberg suggested a resolution endorsing the report of the committee.

DR. WM. M. CAPP said that the absence of support complained of may be due to the prevalent belief that there are already a sufficient number of hospitals, and that the purpose of building another is in conflict with the city ordinances already quoted. An enterprise of this kind would be costly, but, for pay patients, it should be conducted by private capital on a purely financial basis. As a public institution the average lay mind would consider it a scheme for private gain, offering as it does, a pretext for future raids upon the public treasury. It is feasible and proper for general hospitals to reserve wards in which infectious cases may be isolated. This could be done in large hospitals on a more extended scale than at present, and with equal advantage to patients should a demand for it arise. It would cost much less than to build, equip, and maintain a new building. The scheme for a hospital for pay patients commends itself as a private but not as a public enterprise.

DR. HENRY BEATES, JR., said: The present methods in dealing with epidemic pestilential diseases, so far as the yellow labelling of houses is concerned, are utterly inadequate to secure the ends for which this plan was adopted. Much suppression of the true conditions, as well as misrepresentation, renders the statistics formulated from the yellow label system, utterly unreliable, misleading, and obstructive to those processes which lead up to the proper understanding and knowledge of how best to protect a community in dealing with this class of disease.

Viewed from every standpoint, a pay hospital, properly managed, is essential for supplying those conditions necessary to obtain accurate knowledge as to the proper management of these diseases. This Society is the representative of the highest type of medical science, and should identify itself, in so far as this one subject is concerned, with progress and development, by a unanimous expression of approval of Dr. Taylor's report.

DR. B. ALEXANDER RANDALL suggested that it would be well to so frame the resolution that it should not be distinctly in opposition to the

present position of Councils that no new hospital can be erected in the city limits. As stated by Dr. Schamberg, to place the hospital at a distance renders it almost useless. As it is, if the Municipal Hospital ambulance is called for, a half or a whole day sometimes elapses before the case is sent for. The indication for such a hospital is very clear. The matter was brought home to Dr. Randall by another case similar to that of the physician quoted. Yellow labelling will be discussed at the next meeting of the College. It is to be hoped that the city authorities will be able to isolate patients without proclamation by label.

DR. TAYLOR said he had desired an expression of opinion by the Society in the hope that when the matter came up later, the desired support might be given it, and that the public might be educated to regard the project as desirable and necessary. New York, Boston, Chicago and St. Louis have the desired institution in working order, while Philadelphia wastes time and does nothing.

DR. RANDALL asked whether the possibility of a pay ward in connection with the Municipal Hospital had been considered.

DR. TAYLOR replied that the Hospital would have plenty of rooms and that he would be willing to accept the suggestion. Suggestions and expressions of interest were desired.

DR. RACHEL S. SKIDELSKY said the need of the hospital was self-evident. It was however a mistake not to credit the first money making effort to the members of the Woman's Health Protective Association. Enthusiasm is greater and more lasting with women, and it was ill-judged to over-look this body of women, who had worked so faithfully for this project. If Dr. Taylor would keep their interest in view, they would aid very much in securing money. Some of the members of the Woman's Health Protective Association were proposed as Directors and were refused.

DR. TAYLOR replied that Dr. Skidelsky, he thought, was misinformed. If former members were refused as directors it was simply because they had resigned from the Woman's Health Protective Association.

Some Diseases of the Ear in Children.

BY GEORGE C. STOUT, M.D.

[Read February 28, 1900.]

The more common diseases of the ear occurring in childhood will be touched upon in this paper, and for the better convenience of the busy practitioner only such treatment as has proved most efficient in my hands will be given. The diseases requiring instruments of precision for their diagnosis and belonging essentially to the expert will not be dealt with.

Before considering the various forms of affections of the ear, it may be well to recall a few facts of special interest in the anatomy of the ear in early life. The ear of the child, like that of the adult, is divided into: I. The sound conducting apparatus, which includes, (a) The external ear, auricle and external meatus; (b) The middle ear (the tympanic cavity with membrana tympani and ossiculæ, the eustachian tube and the cup-shaped cavity which is the precursor of the mastoid cells): II. The sound perceiving apparatus, the internal ear or labyrinth.

The external meatus of the infant is nearly as deep as that of the adult; absence of the bony canal at this stage is compensated by the presence of the fibrous membrane in which the bone is formed later. The caliber of the meatus is smaller in infancy and more than apt to be prolapsed, while its direction in the very young is often at first downward instead of upward. It is therefore often necessary in order to obtain a good view of the fundus to draw the auricle downward and outward, and not upward and backward as is the case in the adult ear, or in that of later childhood. It may be well also to remember that the dropping of the lower jaw will sometimes enlarge the meatus.

The lining of the middle ear is continuous, through the eustachian tube, with that of the naso-pharynx, and therefore diseases of the vault of the pharynx whether primary or secondary are apt to be accompanied by ear symptoms. Among the anatomical factors which make diseases of the middle ear an especial menace in childhood is the suture (*sutura petroso squamosa*) which is found in the roof of the middle ear at this age, and which sometimes amounts to a dehiscence which persists throughout life. In the newborn infant processes of connective tissue from the dura containing bloodvessels pass through this suture into the tympanic cavity. It may thus be readily seen why a hyperæmia of the tympanic mucous membrane would promptly spread to the dura and cause the meningeal irritation which is so often met with in middle-ear diseases in children. The foetal tympanic cavity is filled with a gelatinous mass some of which persists partially degenerated after birth as a yellowish green, thick fluid containing fat and pus corpuscles, which are usually absorbed a few weeks after birth, but which at times causes an inflammation of the tympanum and leads to the perforation of Shrapnell's membrane which has been named the foramen of Rivinus. The lining membrane of the tympanum in the newborn infant is remarkable for the abundance of its vessels and its general tumefaction. The mastoid antrum is the only one of the air-spaces present in the newborn.

The ears of children should be carefully examined in the exanthems and infectious diseases and in cases of fever where the diagnosis is doubt-

ful, on account of the liability of throat affections to spread through the eustachian tube to the middle ear. In these cases the onset of the disease is apt to be insidious and unless looked for may not be discovered until it has gone so far as to cause permanent disability. The habit of treating lightly the affections of the ear in childhood is to be deprecated. The importance of their early diagnosis and prompt treatment is realized when we consider that fully two-thirds of the ear cases which present themselves for treatment in adult life, originate in childhood, and a large proportion of them might have been cleared up by a few simple treatments in their early stages.

Many people, including all classes and conditions, are apt to treat the ear diseases of childhood lightly, an idea which, I regret to say, is concurred in by some physicians. Death has occurred in such cases from meningitis when the seriousness of the ear trouble was entirely unsuspected. Indeed ear affections are the most common cause of leptomeningitis. Among the diseases which show a special predilection for ear involvement are scarlet fever, measles, diphtheria, typhoid fever, influenza, and syphilis.

The only instruments required for an examination of the fundus are a head mirror, a strong light, a delicate cotton-tipped probe, and possibly a speculum.

The ear troubles which occur in childhood may be classified as: I. Diseases of the External Ear; II. Diseases of the Middle Ear; III. Diseases of the Internal Ear.

I. DISEASES OF THE EXTERNAL EAR.

The diseases of the skin which occur in the external ear may be of almost any variety and should be treated by the same means which are used in similar diseases occurring elsewhere.

ECZEMA of the auricle and vicinity is the most common of the skin diseases met with in this locality. It is most often caused by excoriating discharges from the middle ear and will usually promptly yield to treatment after removal of the cause. Treatment.—In obstinate chronic cases the crust should be carefully removed and the surface cleaned prior to the application of healing remedies. For this purpose green or castile soap and water, or better, peroxide of hydrogen may be used to soak the scab, after which it can be readily removed, then the surface may be dried by a solution of nitrate of silver (60 grs. to the ounce of water), after which an ointment of the yellow oxide of mercury (gr. ij to the 3j of petrolatum) should be carefully rubbed into the excoriated surface. In certain cases, after the cleaning process, calomel ointment,

gr. xx to 3j of petrolatum; or an ointment of zinc oxide preceded by black wash; or ichthyol ointment 25% may be successfully used, but most cases yield sooner or later to the treatment first outlined. Most of these cases of eczema are essentially local in character, but, in some of them, cod-liver oil, hypophosphites and, in the non-inflammatory type, arsenic may be indicated.

FURUNCLES or boils occur less frequently in children than in adults. The exciting cause is probably the *staphylococcus pyogenes aureus* and *albus* which penetrate the hair follicles, and which are introduced by mechanical irritants, foreign bodies, the instillations of irritating substances, and the like. They frequently occur in one, otherwise, in apparently good health. They are usually situated near the orifice of the external meatus, in the cartilaginous portion. Their most prominent symptom is pain, which is most intense when they are deep-seated, radiating over the whole side of the head and neck. When not deep-seated, swelling may usually be easily detected by the aid of reflected light. This is at times red or livid, and is very painful to the touch of the cotton-tipped probe. If deep-seated, the pain is more marked, the swelling less so, and there is usually no change of color. Their location, however, may be determined by the aid of the probe. If anteriorly located, the region in front of the tragus may be swollen and tender, and when posteriorly located, they may simulate mastoid swelling and pain. Two conditions which resemble furuncles in appearance are: (a) exostoses when covered by a red skin; (b) bulging caused by burrowing pus from the mastoid or tympanum.

Treatment.—The severe pain of furuncles is most promptly relieved by a deep incision through the tender area which should be done with strict asepsis. The release of the tension consequent to the blood letting will usually bring relief even if no pus be liberated. The incision should be anointed with the official ointment of the yellow oxide of mercury, which should be gently forced into the wound. Should the furuncle be pointed, a small prick will probably bring relief without the prick itself causing any pain. The incision should be made under strong illumination, with strict asepsis, and preferably with a small knife made for this purpose. If the pain is not excessive hot boric solution may be gently syringed into the ear or allowed to flow in from a fountain syringe at a slight elevation or from a teapot. Hot water bags or hot salt or hop bags often give relief, after careful cleansing and the application of an ointment of ichthyol or the yellow oxide of mercury. So, also, hot carbolized oil or carbolized glycerine are at times grateful. The use of sweet oil and laudanum, hot raisins, tobacco juice and what not

through the whole gamut of "household remedies" should be discouraged. Furuncles often occur in series of three or four, and it is well to forewarn those interested of this fact.

CERUMENOSIS.—Excess of cerumen or wax banked up in the external meatus may be caused by (a) frequent hyperæmias of this region; (b) contraction of the meatus; (c) improper cleaning of the external meatus by inserting the twisted corner of a washrag or towel or similar contrivance into the ear.

Parents and nurses should be especially warned against mechanically irritating the lining of the canal by undue cleanliness, and it should be pointed out to them that if the concha be wiped out with a soft moist rag the canal will take care of itself, and that anything introduced into the meatus is likely to do harm and result in anything but the desired cleanliness. These plugs of epithelium and wax may be soft and yellowish, or hard and dark brown. They can be readily detected by the aid of reflected light, and may be safely and promptly removed by syringing with hot water.

Treatment.—The canal should be straightened and opened by tension on the auricle and a stream of hot water from a syringe should be directed around the edge of the plug parallel to the direction of the canal and chiefly along its upper wall. A few syringefuls carefully directed will bring out the plug without further manipulation. Should the mass be too hard, however, it may be softened by a few drops of water and bicarbonate of soda, added at intervals for twenty-four hours, after which it may easily be removed by syringing. Instruments should not be used forcibly for the removal of wax. The wax plug itself is comparatively innocuous, while clumsy instrumentation will bring about grave disturbances. After the removal of the wax the canal should be gently wiped out with cotton soaked in equal parts of peroxide of hydrogen and alcohol, then loosely plugged with aseptic cotton and the directions given that it should be removed at bedtime and left out.

FOREIGN BODIES IN THE EAR.—These may be of any kind or shape and may readily be detected by the use of strong reflected light. The symptoms are not usually serious even when the foreign substance is allowed to remain in the ear over long periods of time. Cases have been reported in which beads, grains of wheat and like substances have remained in the ear for forty to forty-five years only to be discovered by chance at the end of that time. This point should be especially borne in mind as it is better to allow the foreign body to remain in the ear than to use severe measures for its extraction.

Treatment.—The size and shape of the foreign body as well as its

location should be noted by the aid of reflected light; then, with a carefully directed stream of tepid water or boric acid solution the body may be forced out of the canal. The syringe nozzle should be long and narrow so that the course of the stream may be accurately followed by the eye, and it should be so directed that it will pass the body, which will then be forced out by its return flow. This failing in the hands of one unskilled in ear manipulation, it would be well to refer the case to an expert. Clumsy manipulations of foreign bodies have brought about most disastrous results.

II. DISEASES OF THE MIDDLE EAR.

The majority of diseases of the ear occurring in childhood come under this heading, and they may be intelligently studied under four divisions, namely: (a) Acute inflammation of the middle ear; (b) Acute suppurative inflammation of the middle ear; (c) Chronic suppurative inflammation of the middle ear; (d) Chronic catarrhal (sclerotic) inflammation of the middle ear.

(a) Acute inflammation of the middle ear (otitis media acuta) and acute suppurative inflammation of the middle ear resemble each other up to a certain point in etiology, symptoms, course and treatment. They may therefore be considered together. Each may be defined as an acute inflammation of the lining membrane of the middle ear caused by undue exposure, inflammation of the naso-pharynx, foreign bodies or other traumatisms. It may, at times, be superimposed upon a chronic middle-ear catarrh. Both the simple and suppurative forms are more common in children than in adults. Usually, but one ear is affected at a time, although, in cases of scarlatina or typhoid fever, both ears are often affected. The two forms resemble each other up to the point of perforation of the membrana tympani, which determines the suppurative condition. In the suppurative condition, however, the symptoms are apt to be more aggravated. Scarlet fever is a most fertile source of middle-ear inflammation. 20% of all chronic diseases of the middle ear originate in this disease. The onset of the ear trouble in scarlet fever is often insidious, and unless the ear is examined, even when there are no symptoms present, its course may be partly run and irreparable damage done before detection. It is interesting to note in this connection that the ear symptoms, in scarlet fever, are closely associated with the nephritis, and it has been held that the early cure of the kidney condition has a happy effect on the course of the ear trouble and *vice versa*. Special examination of the ear should be made from time to time as a routine procedure in scarlet fever, odor and discharge should

be carefully looked for so that the danger of infection of the meninges may be guarded against. The ear is less frequently affected in measles than in scarlatina. Here again the ear trouble is the result of extension of the inflammation from the throat through the eustachian tube. In measles, the otitis is apt to be of milder form than in scarlet fever, but it should nevertheless be carefully looked to. In hereditary syphilis, inflammation may spread through the eustachian tube to the middle ear. In rheumatoid arthritis, ankylosis of the ossicula may rarely occur in childhood, while in Hodgkin's disease deafness may occur from occlusion of the eustachian orifices by adenoid enlargement. Ear diseases may be early manifested in leukæmia.

Symptoms.—There may be no early symptoms or there may be a stinging throbbing pain extending at times over the head to the teeth, usually intermitting and worse at night. In children there is frequently a tenderness over the whole external region of the ear, more especially over the region of the eustachian tube in the neck. In the very young, ear pains are frequently indicated by the patient putting the hand to the affected ear, or leaning towards the affected side, also by restlessness and irritability. There may or may not be fever, although in the suppurative form there is apt to be a rise of temperature. Older children may complain of noises or numbness in the head and of difficulty in hearing. Examination of the fundus in this condition discloses the *membrana tympani* more or less injected, especially in the region of the short process and manubrium.

(b) **Acute suppurative inflammation of the middle ear.** In the more severe forms (suppurative forms) which lead to perforation, the entire *membrana tympani* is injected as well as the osseous meatus, so that it is difficult to tell the *membrana tympani* from the walls of the canal, as the boundaries are no longer well defined and the perspective lost, while the cartilaginous meatus is often painfully swollen as well as the external parts and the neighboring glands. A perforation when present is difficult to be seen even by the expert. However, its presence may be recognized by the discharge and cessation of the severe pain. The results of middle-ear inflammation are: (1) Healing; (2) Transition to the chronic form; (3) Progression to the suppurative form, mastoiditis, meningitis or sinus phlebitis.

Prognosis.—Generally favorable except in the infectious cases or in weaklings.

Treatment.—This should first be directed to the naso-pharyngeal condition. The naso-pharynx should be thoroughly sprayed with an alkaline antiseptic solution. The Politzer bag tip should then be ap-

plied to one nostril and the bag forcibly compressed so as to blow any remaining secretions out of the opposite nostril. The naso-pharynx should then be wiped with a curved cotton-tipped applicator, which has been previously dipped in boro-glyceride or dilute glycerole of tannin and introduced through the mouth back of the soft palate. The eustachian orifices should receive special attention in this cleansing process. The Politzer bag tip should then be applied to one nostril, the other firmly compressed and the vapor of chloroform or iodine, or simply heated air from above a lamp should be gently forced into the middle ear. In order to maintain sufficient pressure in the naso-pharynx to successfully Politzerize the tympanum, the soft palate should be raised against the posterior pharyngeal wall, to accomplish which the patient should be told to puff out the cheeks or swallow a sip of water. If water be used, the bag should be compressed at the moment the pomum Adami rises. The act of crying will also serve to raise the soft palate. During the early stages, this line of treatment will often immediately relieve ear-aches as well as deafness. This failing, a hot water bag should be applied to the ear or a hot douche of water or boric acid solution, long continued, may be used with gentleness. The various household remedies so often indulged in should be adjoined. They embrace poultices, onion cores, sweet oil, hot raisins, laudanum, the painting of the mastoid with tincture of iodine, or even blistering it. Poultices tend to increase the congestion, onions are surgically unclean, iodine and blistering disguise mastoid complications which may arise later. If the symptoms are severe, indicating that we have to deal with the suppurative form, a paracentesis will give relief when there is bulging of the membrane. This little operation should be done under strict asepsis and strong illumination. The most prominent point should be incised, care being taken to avoid the ossicles and due account being taken of the obliquity of the tympanic membrane. Injuries of the promontory are not apt to retard the healing process. The incision should be followed with inflation by the Politzer bag as described above and a hot douche, or syringing with hot water or boric acid solution, after which the canal should be dried and stopped with aseptic cotton. Daily cleansing and Politzerizing should follow until suppuration ceases. Due attention should be paid to the general condition and the indications met as in ordinary cases. The patient should be kept in a recumbent position. Should the mastoid region become puffy, boggy, red, and tender with intermitting fever and especially, if these symptoms are accompanied with puffiness of the superior, posterior, inner wall of the meatus, opening of the mastoid is indicated. Sudden cessation of the discharge with

a drop of temperature and slowing of the pulse imply that the pus has made into the cranial cavity.

(c) Chronic suppurative inflammation of the middle ear may be defined as a suppurative condition of the middle ear occurring most frequently in childhood, and involving the tympanic membrane and often the external meatus, the bony walls of the middle ear or even the labyrinth.

Etiology.—The more common cause is the progression of the acute purulent otitis of childhood, especially that following scarlet fever, diphtheria and typhoid fever or other infectious exanthematous diseases. It is frequently bilateral. It may, at times, develop in certain cachexia without the previous acute phenomena.

Symptoms and Results—are most various and complicated. It will be sufficient for our purpose to state these in a general way only, leaving the details to text-books devoted especially to diseases of the ear. In the very young, attention is frequently first called to this disease by the discharge from the meatus or by the odor. Headaches or fulness in the head may be present, or more rarely giddiness or vomiting; disturbances of hearing, in varying degrees, are usually present, and should there be damming up of the pus, pain is also experienced. The *results* of this disease are: (1) Hypertrophy of the mucous membrane; (2) Hyperplasia in the form of granulations or polypi in the tympanic cavity; (3) Connective tissue formation leading to adhesion between the ossiculi, membrana tympani and walls of the tympanum; (4) Destruction of the mucous membrane, membrana tympani and often of the bony parts. The tympanic membrane is almost always perforated and it may be thickened. The perforation may be of any degree or shape. There may be caries or necrosis of the temporal bone or the formation of osteophytes. The secretion may vary in character and quantity, and the presence or absence of odor is not significant excepting as indicating the retention of secretion. There may be changes in the secretion of cerumen or cholesteatomata may be formed.

Treatment.—While the treatment varies according to the character and extent of the destruction of the parts, it may be outlined in a general way. As in the acute form, the naso-pharynx should be cleansed and the tube-mouths wiped out, then the ear should be gently wiped and dried by a tuft of aseptic cotton on a delicate applicator, following which a similar tuft dipped in peroxide of hydrogen may be gently wiped over the surface to boil loose particles of dry muco-pus, epithelial scales, bony detritus and so forth. The middle ear should be Politzerized to clear the eustachian tube and again wiped clean. If there is

tumefaction of the mucous membrane, a solution of alcohol (50% at first, gradually increased to 95%) may be applied to it, and then again one should Politizerize, wipe dry, dust with small amount of boric acid by means of an insufflator. If these cases prove obstinate, aqueous solutions of silver nitrate (60 grains to the ounce) may be substituted for the alcohol solution or a solution of sulphate of zinc (4%), or a solution composed of alum (1 dram), zinc sulphate (1 dram), carbolic acid (40 grains), water (2 ounces). If polypi are present, they should be snared, or they may be reduced by alcohol or chromic acid applications. Caries may indicate curettement, or the removal of ossicles, or even one of the various mastoid operations. At times the cleansing process may be aided by the use of a rarefacteur to draw the pus into the external meatus, or the eustachian catheter may be needed the more forcibly to clear the tube or to guide various fluids—*e. g.*, boric acid solution (4%) and warm saline solution—through it. Aristol, iodoform, acetanilid or their modifications may be substituted for the boric powder. These cases should be cleansed every other day at first and then, as they improve, twice weekly, once weekly, and so on, gradually increasing the intervals between treatments as recovery progresses. Internal treatment is indicated in rheumatism, syphilis, anæmia and so forth. Cholesteatomatous masses may be removed by means of the curette or attic syringe, or may require a mastoid operation.

(d) Chronic Catarrhal (adhesive) Inflammation—of the middle ear. This name has been given to those inflammations of the middle ear which give rise to sclerotic (adhesive) changes in its lining mucous membrane, and lead to permanent defects of hearing. The condition may start in an exudative catarrh or it may start insidiously as an interstitial inflammation which is progressive. The condition, after running an insidious course, usually ends in extreme hardness of hearing. Fortunately this disease is not frequent in children, although its occurrence in after life may be precluded by the careful and timely treatment of the exudative forms of middle-ear trouble.

Etiology.—(1) Chronic naso-pharyngeal catarrh; (2) Post-diphtheritic paralysis; (3) Scrofula, tuberculosis, marasmus or anæmia.

Pathology.—The pathological changes consist in the formation of fibrous connective tissue in the mucous membrane with shrinking (sclerosis), atrophy, and calcification of the newly formed tissue. Thus, the ossicles are bound to each other and to the walls of the tympanic cavity. The tympanic membrane may appear normal, may be thickened or atrophied, or may have chalk deposits within it. The symptoms to be looked for in children are progressive deafness, subjective noises, which latter,

however, rarely annoy them even when present, and there may be *mental dulness*, which may be the most prominent symptom.

Treatment.—Hygienic conditions should be carefully attended to, wet feet guarded against as well as sudden cooling of the body, and cold sleeping rooms should be avoided. The nose and naso-pharynx should be placed in approximately normal condition by the removal of deformities, polypi, etc. Politzer's method or the catheter should be used to inject air, chloroform vapor, iodine vapor, or various solutions (?) into the middle ear. Gentle aural massage by means of Siegle's or Delstanche's apparatus are often indicated. The use of the Valsalva method is not advised, although auto-massage by pressing the finger to the tragus may be encouraged.

III. DISEASES OF THE INTERNAL EAR.

These diseases are fortunately less frequent than those of the middle ear. They are, however, relatively more frequent in children than in adults, probably for the reason that the channels of communication between the internal ear or labyrinth are more free and more numerous in the young. The causes of nerve deafness are the infectious fevers and the exanthems, syphilis, leucocythemia, diabetes, Bright's disease, mumps, meningitis, brain tumors, traumatism, intense sounds—as explosions and the like; extreme mental strains—such as fright, and angio-neurotic congestion.

The *symptoms* may be classed as: (1) irritative and (2) paralytic, and include subjective noises, hyperacuteness of hearing, dizziness, vomiting, loss of co-ordination and loss of hearing. At times they develop slowly, at others the onset is sudden.

The *prognosis* is unfavorable, as a rule, though at times, as when due to syphilis, hysteria or medicines, there may be improvement.

Treatment.—This should be directed to the general condition. Such remedies as quinine, iodide of potash, mercurials, pilocarpine and the bromides are most commonly indicated. Quinin will increase the blood supply, bromides decrease it. Iodide of potash tends to reduce round-cell infiltration or absorb particles of inflammatory tissue. Pilocarpine in 2 or 4% watery solution is also supposed to further the absorption of round cells or of inflammatory particles.

Panotitis is a form of ear disease occurring chiefly in children—often in the course of diphtheria or scarlet fever, in which there is a suppurative process in both the middle ear and labyrinth, accompanied with high fever and a discharge from both ears and terminating in deafness.

Prognosis, in this disease, most unfavorable, total deafness usually

resulting. The internal administration of iodide of potash or of pilocarpine may be of some benefit.

DISCUSSION.

DR. J. M. TAYLOR expressed his surprise at finding so little attention paid by the general practitioner to the conditions described, which are, therefore, referred to the specialist. It would be wiser for the general practitioner to be familiar with the indications of ear lesions. Cases might, then, often be cured in infancy, or, when recognized by the general practitioner as sufficiently grave, could be referred at once to the specialist. The general idea of large fees deters many from consulting a specialist; but, it is his duty to make the value of such service more clear and forcible.

DR. B. ALEXANDER RANDALL said it was very difficult to know how to deal with the cases referred to the specialist by the general practitioner, and that if the latter would only indicate what fee he thinks the patients could afford to pay, it would be a great help to the specialist and would be a justice to the practitioner. It is unfair to the practitioner for the specialist to charge a fee identical with that of the practitioner, and it certainly is not fair to the specialist. In the examination of the ear much can be done without any apparatus beyond that which nature herself supplies. With the head so placed that the sunlight falls directly upon the drum head it is possible to see whether there is any foreign body or what the conditions may be.

DR. S. SOLIS COHEN, in supplement to the statement of Dr. Randall about examination of the ear without an instrument, said that some physicians, who were unable to see into the ear while the patient's head was erect, could see the canal in children with the head held horizontally and the auricle adjusted with the physician's thumb and finger.

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Anatomy of Hanging.

BY EDMUND W. HOLMES, A.B., M.D.

[Read March 14, 1900.]

I hold here a sample of the knot and rope used in hanging. There is a running noose through a heavy knot, made so that it will slip easily and get tighter. This was tied by a man formerly in the navy. The gradual tightening of the noose is an important factor in the carrying out of the legal sentence, because the mechanism of hanging is more by strangulation than by breaking the neck, dislocation of the vertebræ being of comparatively rare occurrence.

My interest in this subject was aroused some years ago because of the exceptional opportunity afforded me to examine the bodies of those sent to the dissecting room who had committed suicide by hanging, as well as an occasional victim of a judicial suspension; with a chance to verify my conclusions experimentally upon the cadavera, I was quickly led to surmise that the majority die from apnœa and not as it is usually supposed from a broken neck.

Although the methods of death in homicidal strangulation and in hanging are quite similar, yet, strictly speaking, in hanging, the body itself is the force applied at right angles to the constricting loop, while in homicidal strangulation, the constricting force is applied from without at right angles to the long axis of the body. The latter is the mode of capital punishment in Spain by the steel garotte, in China by the bowstring. In England, in the United States, in Austria, in Germany and in fact in the majority of civilized countries, neck suspension is the official method of expiating lawyers' mistakes. In New York State they electrocute, while in France they shorten life by cutting the heads off.

In criminal medico-legal practice, strangulation by thugs is not infrequent, but murder by hanging is exceedingly rare; while on the one hand, homicidal hanging is rare, suicide by hanging is the favorite method. Thus in Berlin, out of three hundred and sixty-eight recorded cases of suicide, a hundred and eighty-nine were from hanging (Reese); and in England within a period of five years no less than twenty-five hundred and seventy persons took their own lives in this way. Suicide by hanging has been perpetrated by a boy of nine and by an aged man of ninety-seven years.

Of accidental hanging, I note the case of a man sitting upon a load of wood with the lines around his neck, he slipped off and was strangled. A child six months old, in a high chair, fell between the guard and the seat with a similar result. In my own practice, some years ago, a boy about a year old slipped feet first between the side railings of his crib and was discovered just in time to be resuscitated with difficulty.

The methods of self destruction on record exhibit a curious variety and some degree of originality. Thus: a woman collected descriptions of all the "celebrated" people who had been hanged, and finally hanged herself. An insane man in France applied his neck firmly to a V-shaped fork of a tree. A man aged 45, cut his throat and then hanged himself (W. & B. p. 761). The authors remark "he probably just had time to hang himself before he died." A woman, aged 77, committed suicide with a sheet fastened to a low bed post, she lying prone upon the floor. A man placed a running noose around his neck, fastened the other end to a short bed post, and lying on his back obtained a purchase by pressing his right foot firmly against the bedstead. Another, twisting his sleeping gown, hung it in a single loop over the post, leaving just room enough below the footboard, to insert the head face downwards, strangulation occurring partly by the weight of the body and partly by compression of the neck between the lower edge of the bed and the noose. A lunatic was found in a kneeling position, hung up to a door hinge in his cell. Another in a sitting posture had hung himself to a door knob. In 1830 the Prince of Condé was found dead, suspended by two handkerchiefs to a window fastener, his feet touching the floor. Another unfortunate was seated upon the ground, the rope being attached to a clothes-prop stuck perpendicularly at his side. Again, a man tried to kill himself first with phosphorus then with sulphuric acid, and failing in this finally hung himself in a half kneeling position. In France they are nothing if not theatrical; a man aged 21 and a woman aged 17, literally hung each other with the same loop, which was thrown over an open door, one hanging on each side, each body acting as a counter-

weight for the other. They had previously tried other means of suicide without success. Tardieu reports 16 cases of suicide, feet together on the ground, 42 cases of suicide on both knees, 29 cases of suicide lying down, 3 cases of suicide in a squatting posture. Further, a suicide may hang himself with both hands and feet tied, and the possibility of his breaking a rope, receiving injuries from the fall and rehanging himself must not be forgotten. From these examples we can readily accept the dictum of Bell "suicide by hanging is consistent with any posture, even if it be, resting upon both feet."

Even in hanging, it seems as if we might safely pray "Defend me from my friends." Thus a man found hanging to a window was cut down too hastily, and falling into a cellar died from a fracture of the skull; another attempted rescue resulted in a similar fall and rupture of the liver. In this connection, might be mentioned the curious Dougat's affair, in which the man was found suspended by the neck, with large bruises upon the abdomen and scrotum. Later on, the wife and son of the murdered man confessed that they had violently compressed the testicles until the man fainted, the wife then suffocated her husband with a woollen cap, the son kneading the abdomen with both knees, the body was then hung up and violently twisted.

Our older members may perhaps remember the Webster-Parkman murder case and General Butler's grim retort. Webster was a professor of Chemistry at Harvard College and shortly after his execution, General Butler was pleading a case in Boston, cross-examining with his usual virulence, so that he appeared not to observe the necessary courtesy; the judge interrupting him said "surely Mr. Butler, you do not know this witness, he is Professor —, of Harvard." "Yes, your Honor," Butler replied, "we hung one of them the other day."

Persons who have been resuscitated declare that after suspension by the neck, quickly there comes a hissing sound in the ears, a floating of lights before their eyes, then darkness and oblivion. Bacon records, that he knew a man who wanted to find out by experience if there was any suffering in hanging; he placed the cord around his neck and stepped off a bench intending to step back again, but immediately became unconscious, and would have died had it not been for the opportune arrival of a friend. He said "A light before his eyes was the only sensation preceding unconsciousness" (p. 724). Fleischmann found he could put a cord around his neck passing in front between the chin and hyoid bone and tighten it laterally or posteriorly, without perceptibly interrupting respiration, but while respiration was still carried on, his face became red, his eyes prominent, and his head felt hot, with a sense

of weight and of incipient stupefaction, followed by a hissing sound in the ears. He goes on to say "on the occurrence of this last symptom, the experiment should be discontinued, or the consequences may be serious." In 1840 a Mr. Scott, an American who had frequently given public exhibitions in suspending himself by the neck, was fatally asphyxiated by the shifting of the ligature. No attempt was made to cut him down for thirteen minutes, the spectators taking it for granted he was only prolonging the experiment for their gratification.

A few years later, John Hornshaw, an Englishman gave similar performances in London under the nom-de-plume of Monsieur Gouffe, (*Lancet*, 1847, 1. 404). He suspended a rope having a loop at the free end, with a fixed knot that could not slip nor draw tightly in any way. Standing at a distance, he apparently dove head-first into the loop, in reality, he seized the rope in either hand and deftly adjusted it around the neck, so that it passed in front under the chin, below the angle of the jaw, and behind the ear, the knot being carefully placed over the mastoid process. Though apparently carelessly done, extreme care was taken to make the proper adjustment before the hands were removed. Hanging thus, he would sometimes hold weights to the amount of one hundred and fifty pounds in his hands, or support another man in his arms. The respiratory function was protected in this way. The os hyoides, the thyroid and cricoid cartilages, and the rings of the trachea were drawn firmly and closely in to approximation in a vertical line by the contraction of the sterno hyoid, sterno-thyroid, thyro-hyoid, and crico-thyroid muscles, thus constituting a single firmly rigid tube, which was then lifted as a whole upwards by the digastric, stylo-hyoid, mylo-hyoid, and hyo-glossus muscles. The chin was, at the same time, well flexed upon the chest so that the rope made an upward pressure upon the body and angles of the lower jaw, the loop therefore catching him below the occipital protuberance behind, and the lower jaw in front, while the platysma-myoides muscle, made tense, protected like a collar the deep structures of the anterior and lateral regions of the neck. Hence, the air tube was not pressed upon in the least; the man remaining suspended for ten or fifteen minutes. In spite of his extreme care he had three accidents owing to the slipping of the rope: In the first, at Grantham, he became insensible, but being set free quickly recovered; he said, during his suspension, "he had a dream." In the second, at the City Theatre, he was not long unconscious. The third accident at the Victoria Theatre was the worst of all. Hornshaw states, he lost his senses all at once. The instant the rope got in the wrong place he felt as if he could not get his breath and as if some great weight was on his feet. There was a rattling

sound in the ears. "You cannot move your arms or legs to save yourself. "You cannot raise your arms, you cannot think." Upon being released, his recovery was remarkably rapid. His subsequent history shows he died some years afterwards in the London Hospital of pulmonary consumption.

In judicial hangings, the fall of the body through the trap, varying from five to fourteen feet adds greatly to the violence and aids in the production of sudden unconsciousness, but, apparently, does not add to the frequency of fracture or dislocation of the vertebræ. In my own experiments upon the cadavera, I have only once succeeded in producing a fracture of the atlas. Sometimes, instead of falling, the prisoner is allowed to stand upon the floor and is pulled upwards by the falling of a counter-weight. According to the authors (with some modification) the causes of death may be classified as follows: (1) *Asphyxia*: access of air prevented by compression of the pharynx, larynx or trachea. (2) *Cerebral congestion and coma*: from compression of the great veins of the neck. (3) *Cerebral anæmia and syncope*: from the arteries being ruptured between the rope and the transverse process of the vertebræ. (4) *Neuro-paralysis*: from injury to the spinal cord and pneumogastrics, or from compression upon the pneumogastrics; to which I would add laceration of the medulla oblongata. (5) I would also add as a fifth cause, and one not recognized by any author, *shock and cerebral concussion*: unconsciousness being immediate because the patient in judicial hangings is stunned by the fall and remains unconscious until dissolution. There are two cases recorded in which the head was wrenched completely off the body; the one in Dublin, having a fall of fourteen feet.

From the testimony of those who have been resuscitated as already cited, we may conclude that hanging is a painless death. It is said persons may be resuscitated after suspension by the neck for half an hour. I cannot conceive how this could be possible in the modern legal method with the long heavy drop, death usually occurring in six to seven minutes, yet Lamb (W. & B. 772) reports the case of a criminal who was cut down after hanging ten minutes and examined half an hour after the drop fell. He was resuscitated and partly regained consciousness, but died three days afterwards of œdema of the lungs with repeated severe convulsions.

In 1733, Mr. Chovet (*Lancet*, p. 404) made an attempt to save the life of a criminal who was hung at Tyburn, by making an incision in his windpipe before the time of execution. He was observed to be alive after the other prisoners suspended with him were dead, and after

he had hung three quarters of an hour, he was cut down. He opened his mouth, groaned and the blood flowed freely upon venesection, but all attempts to elicit other signs of life were in vain. The recent experiments of Laborde for revival after asphyxia are interesting in this connection. He declares that while with the older processes of resuscitation, we could not re-establish respiration where the asphyxia had lasted more than five or six minutes, yet, with rhythmic tongue traction, persons have been restored who have been under water for thirty or forty minutes; that it is better not to despair for at least three hours, and that the heart though arrested shows tremors and resumes its action when the breathing has been started.

The position of the mark naturally depends upon the position of the rope, which in four-fifths of the cases is above the larynx and in one-fifth over the larynx. If it passes below the thyroid cartilages death is more rapid and is due to apnœa. The knot is usually placed behind the left ear, and frequently slips, afterwards, upon or on either side of the ligamentum-nuchæ. It has been suggested to force the knot directly under the chin, the head being then extended dorsally. In judicial hangings the mark is oblique from below upwards below the knot; in homicidal strangulation it is more apt to be transverse. The narrower the ligature and the longer the time of suspension the deeper the furrow. A broad ligature like a strap may simulate a double ligature by pressure at either end. The mark, at first, is a removal of the epiderm, something like a brushburn, the structural twist of the rope being more or less distinctly visible, with a condensation of the subcutaneous areolar tissue giving it a silvery appearance. Reese describes this as a dense, tough, yellowish brown parchment-like furrow, more marked if the body remains long suspended, and capable of production in the dead body even seventy-two hours after death. Superimposed upon the parchment-like furrow is a livid ecchymosed condition with isolated flecks from rupture of individual capillaries due to the great violence and long period of suspension in the judicial method. Bell declares both the parchment and the ecchymosed condition can be produced after death. In my own experiment upon the cadavera I have not been able to reproduce the silvery condition first mentioned; the impression of the rope being more of a condensation such as you might expect upon dead tissue by any blunt instrument, but the skin was abraded, and there was a bruised appearance down to the muscles with small ecchymoses in the course of the mark. Lamb (W. and B.) reports one case of an attempted suicide who was resuscitated, in whom the mark of the rope persisted for fifteen days.

It is perhaps hardly necessary to state that suspension by the neck is not a proof of death by hanging; and that apoplectics with short full necks may have red or livid lines at the bottom of the infoldings of fat which may simulate rope marks. As the rope mark depends upon the length and violence of the fall, the size and structure of the rope and the time of suspension, so the other *post mortem lesions* must vary somewhat according to the method of hanging employed and the circumstances of the case; there being no surety of any one lesion being found in any particular instance.

The *post mortem lesions* may be broadly divided into two classes: (1) *Lesions* due to the sudden impingement of great violence. (2) *Lesions* resulting primarily or ultimately from the compression of the cervical tissues.

(1) *Lesions Due to the Sudden Impingement of Great Violence.*

Concussion of the brain. Laceration of the medulla. Fracture of the crystalline lens of one or both eyes, which may be complete or only a striation or a few fine lines. In one recorded case, there was a dislocation of a cataractous lens. Effusion of blood between the sclerotic and choroid coats.

Dislocation or fracture of the atlas and axis, to effect which purpose it was formerly the custom to give the criminal a twist at the moment of falling, or even it is said for the executioner to sit astride of his shoulders. The odontoid process is sometimes though rarely broken and the odontoid ligaments being ruptured death may then be due to impingement upon the spinal cord. If the transverse ligament is torn, this would also allow the process to press directly upon the spinal cord. There have been a few cases reported in which the intervertebral discs have given way. Fracture of the hyoid bone and of the cornua of the thyroid or of the body of the thyroid cartilages are I believe more common than fracture or dislocation of the vertebræ; the cricoid cartilage may also be torn through.

The skin, the platysma-myoides and the deep fascia on the side of the neck opposite to the knot is remarkably stretched, being very distinctly elongated as compared with the tissues of the opposite side, although the whole neck is somewhat stretched. Laceration of one or both of the sterno-mastoids with effusion of blood into the sheath and tearing of the sterno-thyroid muscle have been found. The trapezius has been torn through. It is said the outer fibrous coat of the great vessels resists the rope, while the middle and internal coats give way. I have not found this either experimentally or in those hanged by suicide or by the law.

Orfila (Reese, p. 169) states that in the examination of fifty persons who had been hanged, he met with a fracture of the os hyoides in only the one and as he had never found a single fracture or dislocation of the vertebræ it is evident the lacerating lesions are not as numerous or as frequently found as is generally supposed, and this is true however the knot may be placed. In fact if for the moment you will consider the noose as a rigid ring placed at right angles to the long axis of the body, the drop being suddenly sprung, the body shoots perpendicularly towards the earth, so that the force is really applied against the occiput and the lower jaw and in a line parallel to the long axis of the body. Unconsciousness occurring from the cerebral concussion the knot slowly tightens from the weight and induces asphyxia. From this view, as is found in actual practice, fracture or dislocation of the vertebræ must be considered rather as an accident, the sliding noose being an important element in carrying out the sentence of the law that "he shall be hanged by the neck until dead."

(2) *Lesions Resulting Primarily or Ultimately from the Compression of the Cervical Tissues.*

These are exceedingly numerous: The vessels of the brain are congested with extravasations upon and into its surface and upon its membrane; or as in the Guiteau case some anæmia. It might be interpolated here that certain of those resuscitated have manifested both aphasia and aphonia for a considerable time. The face is sometimes convulsed with marked swelling and lividity. It is not probable that such swelling and lividity would follow constriction applied even a few moments after death. Congestion of the eyelids; at times with ecchymoses of the eyelids and conjunctiva. Eyes red and protruding; pupils dilated; tongue swollen particularly at base, impinging upon teeth or protruding between the lips. Lower jaw retracted, froth sometimes bloody, escaping from both mouth and nostrils. Face placid, lips blue. Hutchinson tells us as the flow of saliva is a living act if it is found flowing out of mouth down on chin and straight down over chest, it is a sign that the victim was hung up while still alive. Some caution must be observed in regard to this, as a certain amount of saliva will run from the mouth of a subject suspended, two or three days after death.

Congestion of the entire digestive tract is found, with coagulated blood on the mucous membrane of the stomach and small intestines. The kidneys are also congested. The presence of bloody mucus in the respiratory passages with congestion of their lining membrane is highly suggestive of strangulation. The lungs are usually congested and œde-

matous; but there are two cases of collapse of lung reported. The right side of the heart and of the venous system is engorged with dark fluid blood which corresponds to the observation of Laborde, that the blood of asphyxiated animals is rich in carbonic acid and poor in oxygen, but is not coagulated. If death occurs from apoplexy, both ventricles contain blood; if death occurs from asphyxia, the left cavities are found empty while the right side of the heart and the great vessels of the lungs are full. Sometimes there is some pericardial and pleural effusion.

The hands are tightly clenched and the legs extended. Escape of urine and fæces. Turgescence of the male genitalia with seminal emissions, a reflex effect through congestion of the cord, aided no doubt by passive congestion *in loco*, is sometimes but not universally met with. Similarly in the female, congestion of the labia with the escape of menstrual blood, and the erection of the clitoris have been noted.

In the celebrated case of Guiteau (Lamb, *Medical News*, July, 1882), so far as our topic is concerned the post-mortem conditions induced by the hanging seem to have been: *Dura Mater*: some "arborescent congestion" of the vessels of the dura in the fossæ at the base of the skull. *Pia Mater*: anæmic anteriorly, slight hypostasis posteriorly. *Brain*: white substance of brain anæmic. *Eyes*: pupils slightly cloudy and dilated; vitreous cloudy; fundus indistinguishable; slight transverse fracture of both lenses. *Neck*: yellowish furrow in the line of the rope; both sterno-mastoid muscles torn in two about half way between their points of origin and insertion. Thyro-hyoid ligaments are also ruptured, and the hyoid bone and thyroid cartilages widely separated. Large bloodvessels of neck not injured. No fracture or dislocation of vertebræ. *Chest*: there was an extravasation of blood into the right pectoralis major muscle near the second rib. The right ventricle of the heart contained a little blood just forming a clot, but a considerable quantity of dark blood ran out in the separation of the heart and lungs. *Abdomen*: stomach contained food; small and large intestines not examined; liver congested; spleen enlarged; kidneys congested; pancreas normal. *Genito-urinary Tract*: bladder contained a quantity of urine. An erection of the penis occurred during the suspension of the body, and the clothing was afterwards found to be moist. No microscopic examination of the discharge noted.

Herold divides the process of hanging into three stages. 1st Stage: Intense heat felt in the head; flashes of light in the eyes, deafening sounds in the ears; spasmodic effort at respiration. 2d Stage: Unconsciousness and convulsions; face pale with a painful expression, the convulsions being associated with twitching elsewhere and are not indi-

cative of suffering; expulsion of urine, fæces and semen. 3d Stage: Heart beats last from ten to twelve minutes; pulsation of right auricle one and a half to three and a half hours after the body has been cut down. (We would again call attention to our previous remarks upon the experiments of Laborde with regard to the heart resuming its pulsation after respiration has been re-established by tongue traction.) The usual period of dissolution varies from five to nine minutes; but the body is allowed to hang from twenty minutes to half an hour.

Being desirous of witnessing a legal execution, through the courtesy of our city and county officials I was permitted to do so. The sheriff's jury is usually notified some two weeks ahead of the date fixed for the execution, and upon the day appointed about ten o'clock they gather in the ante-room of the prison, and each name being called, each person passing within the railing is administered the oath reading as follows: "You and each of you do solemnly swear that you will act as jurors summoned by —, Esq., High Sheriff of the County of Philadelphia; that you will witness the execution of and certify to the time and manner of such execution accordingly; and you do swear, so help you God." After the signatures of the jury have been affixed, the procession is then formed, consisting of the sheriff, deputies, attorneys, jury and other witnesses, and the door opens which admits directly into the corridor, where the gallows has already been noiselessly erected with bolts and screws. It is painted black, with two uprights and a cross-bar, from which the noose is dangling; the platform being two trapdoors which open downwards, approached by steps from the east side. The procession passing slowly saw the condemned man standing at his cell door with his hands manacled, an attendant on either side. While this is said to be a part of the legal requirement for purposes of identification by the jurors, it must be a fearful ordeal for the prisoner. The procession ranging itself to the west of the scaffold, the sound of the clergyman's voice reading the solemn church service is heard and the heads of the prisoner and the deputies are seen as they mount the steps. Almost as soon as the condemned man reached the centre of the platform the clergyman ceased reading. The doomed man looked over the witnesses apparently without a tremor; I watched his eyeballs but could not detect a single oscillation; his face was impassive, reflecting curiosity if anything. I am told there was involuntary passage of urine at this time. One movement of the attendant passed a long black cap over the face; the next seized the noose, a half-inch rope dangling above, and placing it round the neck the knot was forced, it seemed to me, rather in front or below the ear than behind it and so forcibly

tightened that the victim winced. I must confess I could feel my heart jump and beat violently and a little sensation of weakening about the knees, and the thought crossed my mind that neither any man nor any community had the right to take the life of another under any circumstances. In a moment the deputy stepping back, dropped his hand as a signal, a tremendous crash followed as the doors of the platform fell. My own heart seemed to leap upwards and turn on its base; while the appropriate and historically pious ejaculation "My God" of some one near me, I doubt not expressed the feeling of many of those unaccustomed to such sights.

The drop was five feet; the legs drew up twice, the hands slightly opened and clenched again, then the body hung limp and quiet, with the head bent over to the right, swaying slightly from side to side. To my mind it must have been unconsciousness at once from the concussion of the brain. After six or seven minutes we knew life could not be there then the strain was removed; it was only poor human clay after that.

The physicians appointed for the purpose gathered around examining for respiratory rhythm and heart-beat, and after hanging, on a guess, something over twenty minutes the body was lowered onto a small truck and the cap lifted to enable the jurors to view and certify. The face was perfectly placid, the eyes somewhat bulging, the lips and features swollen; the mark of the cord showing the bruised and brush-burn appearance but not the characteristic puncta and ecchymoses so far as I could see; I would like those here more experienced to tell us to-night how soon such marks appear in the recently hanged.

We passed out leisurely and by the time we reached Chestnut Street the newsboys were already shouting "Extra! All about the execution!" with a wood-cut of the deceased culprit and a description of the proceedings. I am convinced hanging is a merciful, painless and speedy death, but "*a hanging*" is more horrible than the most horrible of autopsies, and more dreadful than the most severe of surgical operations.

DISCUSSION.

DR. JAMES THORINGTON said there were many unique ways of hanging. In crossing the Isthmus of Panama, he had stopped at a place called Metachino, and was told by the older residents that the name meant "dead Chinaman," and was given because, in building the railroad, so many coolies became discouraged and committed suicide by twisting their pigtailed around their necks and hanging themselves to small trees outside of their huts.

Progress in Therapeutics.

BY SOLOMON SOLIS COHEN, M.D.

[Address of the Retiring President, delivered March 14, 1900.]

The pleasant custom of our Society calls upon the retiring President to signalize his departure from the Chair by making an address to its members and extends the time for such address to a sufficient period after he has been relieved from the cares of office to permit him to give his attention to the preparation of a paper deserving your consideration. I regret that I have not been able to fulfil more worthily the design of your Constitution and custom, but the thoughts to which I shall invite your attention are of some importance, perhaps sufficiently so, to atone for the crudity of their presentation.

We take up our time at these meetings, very properly, with practical matters, with reports of cases from which we can derive instruction in the management of future cases, or concerning which we may be enlightened by the criticism of our fellows; or we bring before each other the results of our studies and investigations in the laboratory for criticism and comment and for mutual instruction. Most of our daily worktime, too, is occupied with the so-called practical matters of relieving those who appeal to us—or at least in endeavoring to relieve them—so that, perhaps, those of us who are not engaged in teaching, who are not engaged in research, pay but little attention to the theory of our art and our science; and some of us, perhaps the majority, consider that theoretical matters are unworthy of much attention; that the physician who is a theorist is unlikely to be a safe physician; that he is more likely to go astray after his false gods of hypotheses in pathology and “fads” in treatment than to occupy his time in learning those practical methods by which he can bring the quickest relief to his patients.

Yet I think this is a mistake. Whether we are theorists consciously or not, we are all theorists unconsciously, and the most practical act and the simplest in the treatment of the sick is guided either by correct theory as to the nature of the affection with which the patient is suffering and of the means applicable to its relief, or by an incorrect theory as to one or both. Therefore it is, perhaps, worth our while, once in a year, to review, somewhat, the theoretical grounds upon which our practice is based, that we may see whether or not they are sound, and whether and how they point to future progress.

Anatomy, physiology, pathology, bacteriology, the various sciences with which physicians are concerned do not directly interest our patients.

The patient comes to the physician for relief from suffering, and the physician is above all else in the minds of the public, in the mind of the particular individual who comes to him, a healer, one skilled in the knowledge of the methods by which those disturbances called disease can be removed or relieved. Thus, it is in therapeutics, especially in the practical application of remedial measures to the relief of the sick, that the physician comes into the most personal and intimate relations with his patient. Of course it is a higher branch of our art and science to prevent disease, and to teach prevention. But, when public and private sanitation has failed, or when through neglect of right living, public and private, disease has become established and application is made to the physician for relief, then the therapist must be first. The physician, as therapist, is the one who is sought.

In the history of the nineteenth century great reference will be made to discoveries in the exact sciences. The medical sciences have yielded their full proportion of these; discoveries in the structure and functions of the human body; discoveries in the agencies and processes of disease; the vast science of bacteriology opening for the first time with its knowledge, direct and indirect, and the possibilities to which it leads.

That great practical advances in treatment—apart from the marvels of surgery so well calculated to hold the popular eye—have also been made during the century is generally admitted, but whether these advances have been based upon the development of scientific principles or are merely happy accidents, is disputed. While it is not my purpose to give an historical review or even to refer in detail to the observations upon which certain broad historical views may be based, yet it is, I think, possible to show by brief references to certain prominent events in the history of medicine during the nineteenth century, that the advances in the theory of therapeutics have been as definite and as useful as the improvements in practice.

Any scientific theory of recovery must be based upon scientific views of the causation and development of disease; and these in turn must be founded upon equally definite and rational views of the development, the normal constitution, and the normal functions of the animal organism. Scientific therapeutics must, therefore, follow scientific pathology; and its application, moreover, must depend upon accurate diagnosis. So long as guesswork constituted the principal portion of physiology and pathology, so long as diagnosis was vague and uncertain, so long empiricism necessarily dominated therapeutic practice and vague or misleading theories were constructed to satisfy the inquiring mind seeking for an explanation or even for a rational hypothetic basis of such prac-

tice. Here, perhaps, I must interpolate a word of qualification: I have no wish to follow the fashion of the day in decrying empiricism. In the absence of definite physiologic and pathologic knowledge, the alternatives submitted to the intelligent physician were, and always will be, rational empiricism or irrational dogmatism; and it is to the empiric school of Hippocrates rather than to their dogmatic opponents, that must be ascribed the foundations of scientific medicine. Nor is it to be forgotten that observation at the bedside may be as scientific as observation in the laboratory; or that the result of laboratory experience is as truly empiric, in the large sense, as the result of clinical experience.

In the domain of therapeutics the unscientific character of dogmatism cannot be better shown than by reference to that comparatively modern school of dogmatists founded by Hahnemann. The modern graduate of the college in our own city which bears the name of Hahnemann has departed widely from the theory and the practice of the founder of homeopathy; and what I shall say will have no reference to such heretical homeopaths.

Hahnemann and his early followers rightly finding much irrationality, perhaps harmfulness, in the theory and practice of their contemporaries, sought for some guiding principle that might be applied in the treatment of all cases of disease, and which would obviate the apparent necessity of resort to the violent purgings, bleedings and blisterings and the nauseous polypharmacy then in vogue. But Hahnemann fell into an error worse than that of his contemporaries. He abandoned the methods of observation and induction by which, however crudely and imperfectly, physicians were guided; condemned the study of physiology and pathology; repudiated nosologic diagnosis; rejected with terms of opprobrium any belief in the curative powers of nature; and substituted for all these an absolute dogmatism entirely independent of observation, based upon a one-sided metaphysics, and affirming as a chief tenet the sole and universal curative power of drugs. The drugs were to be administered after a certain fashion, and to many this seems the most important feature of his doctrine; but, in reality, the faith in the power of drugs and the belief in their necessity appears to the philosophical inquirer the greater member of the paradoxical couplet: paradoxical because in his writings Hahnemann insists, throughout, upon the intangible, spiritual nature of life and its processes and the necessity for equally intangible and spiritual agencies as remedies for its derangements. From the necessity to reconcile these opposing beliefs arose the doctrine of the potentization by attenuation of medicinal substances, because thus only

could their spiritual forces be released to act upon the spiritual life processes in health or disease.

There is always a class of educated—or half-educated—persons whose training has been literary and artistic rather than scientific, to whom such mysticism in medicine will strongly appeal. In our own day almost equal fashion and vogue have been given to a similar delusion and to a method of practice built thereon, which, unwarrantably associating with itself the name and authority of religion, assumes the title of “Christian Science.” The system of Mrs. Eddy and the system of Hahnemann have these things in common; that both assume to be revelations from God; that both deny the materiality of the alterations produced in the human body by the processes of disease; and that both assert the necessity of immaterial curative agents. The nature of these immaterial curative agents is different in the two systems—the spiritual forces set free from drugs by solutions, shakings and poundings in the one case, the spiritual force of mystic jargon and dislocated syntax in the other case—but this difference is also immaterial. I am not now concerned either in elucidating or in refuting their special errors, but merely in illustrating the inevitable tendency of dogmatism as opposed to rational empiricism in therapeutics. It can lead only to systematized delusions.

But, while the rational physician of the present day must be an empiricist, he must also be a theorist. He must have a reason for that which he does and for that which he refrains from doing, in his endeavors to prolong life, to promote comfort, and to bring about recovery; and his experience as to the results of such doings or such refrainings must be the ultimate test whereby he determines the correctness of his reasoning and decides upon persistence in, abandonment, or modification of his course.

Progress in therapeutics, therefore, depends not only upon acuteness of observation at the bedside, not only upon accuracy of experimentation in the laboratory of physiology or chemistry or pharmacology, but also upon broadness of grasp and accuracy and acuteness of reasoning, in establishing general principles and in applying special deductions. While the therapeutic art will necessarily always outrun therapeutic science:—as for example the use of quinine in ague antedates the rational explanation of its action, only possible after the discovery of the malarial parasite;—as for example the usefulness of mercury and the iodids in the cure of lues have as yet no satisfactory explanation;—nevertheless, therapeutic science can advance and be followed rather than preceded by advances in the therapeutic art, when we shall have learned to properly coordinate the discoveries now becoming independently developed in

laboratories of medical and general science. Indispensable to such co-ordination, seems to me that conception of the general character of vital processes as the manifestation of a special mode of universal energy, correlated with but differing from all other modes of energy, which I have endeavored to organize by the introduction of the term *bionergy*. Bionergy is vital force, but not the innervated vital force of older writers. It is convertible into and reproducible from all other forms of molar or molecular motion; and affords the conception necessary to bring the phenomena of normal and abnormal life into definite relation with our general conceptions of cosmic processes.

On the other hand, the development of a science of therapeutics has been seriously threatened during the present century by certain great discoveries made in other branches of medicine and biology and by the almost miraculous achievements of synthetic chemistry—one-sided interpretations of the discoveries and unbalanced enthusiasm over the powers of the new agents added to the *materia medica*, being responsible for these temporary aberrations.

The development of the cellular pathology with the discoveries which it brought about as to the more intimate nature of lesions, and the attention which it concentrated upon morbid anatomy, was followed by an era of therapeutic nihilism. Or rather, as it has been said that the government of Russia is "a despotism tempered by assassination," so perhaps we might say in this respect, that it was an era of nihilism tempered by credulity. Out of these equally unscientific errors we are only now beginning to emerge. Nor is it strange, in view of the extravagant ideas concerning the effects of remedies which had previously held sway, when but vague notions were entertained as to the actual constitution of the human organism and as to the changes therein, producing or produced by disease, that those who now saw with the enlarged eye of microscopy the new world of cells and cell alterations and realized the futility of attempting to influence these by the methods of drug administration that had been so positively claimed to be curative, should in reaction, deny to art all power over disease and its processes; and should attribute recoveries simply to the failure of the agents of disease to maim or kill.

So, too, in another direction the discovery of the large part played in etiology by bacteria led not only to a grossly inadequate conception of the rôle of the human organism itself in lesion and in symptomatology, but also to the fallacious notion that the agents of cure must be sought in germicides; so that for a time the corrosive chlorid of mercury promised to become the physician's panacea and the surgeon's chief dependence. It is no small satisfaction to me to remember that I opposed

these views from the beginning, even at the cost of being called "reactionary."

When Brown-Sequard first began to investigate the therapeutic properties of glandular secretions, and following this came the demonstrated usefulness of thyroid gland substance in myxedema, the animal extracts became the subject of foolish or fraudulent exploitation; but this has already been outlived and the scientific study of the internal secretions, and the physiologic and pathologic properties of animal tissues and fluids offer great possibilities of increased therapeutic knowledge and power.

When the synthetic chemists produced kairin, antipyrin and the other coal-tar products, with their tremendous power in depressing temperature and in relieving pain, the temptation to produce sudden and striking results with these agents was too great to be resisted; and many physicians deluded themselves with the idea that in suppressing a symptom they were fighting disease. In nothing was this bad practice, due to want of a rational therapeutic theory, more disastrously manifested than in the treatment of the pandemic of influenza only ten years ago. If influenza then slew its thousands, antipyrin slew its tens of thousands. And only less disastrous was the use of this drug and its congeners in cases of typhoid fever and of pneumonia. As the medical historian comments upon the abuse of bloodletting in the eighteenth century, so will he comment upon the abuse of antipyretic medication in the nineteenth century.

But to digress for a moment—as in every evil there is some good, so in abused remedies there is still a power of usefulness. There is a legitimate field for the drugs of the coal-tar series in the palliation of certain symptoms of nervous origin; so also is there a field for bloodletting in the toxemias, as in pneumonia, in uremia, in puerperal infections and the like, especially as a preliminary to the use of physiologic salt solution; and both of these applications are to be numbered among the advances in therapeutic art and science.

Still another danger, arising out of the great power over symptoms of the modern synthetic remedies and the great improvements constantly making in the art of pharmacy, is the flood of proprietary remedies, secret or half secret, that has been let loose upon the profession and the public. In so far as they are not secret, these threaten to destroy the art of rational prescription. Organs that are diseased, atrophy. The practitioner who is lazily contented to give the mixture exploited by some manufacturing firm, rather than to use his own brains to find a remedy or a combination of remedies suitable for the case of his individual

patient, loses the faculty of selecting or combining remedies. In so far as these preparations are secret nostrums, they threaten to destroy all therapeutic science; for ignorance, which is the aim of secrecy, is the very antithesis of science. The physician who uses an alleged remedy of the composition of which he is ignorant, can have no scientific basis for his action, can add nothing to his own knowledge for guidance in future cases, can add nothing to the general store of knowledge of the profession. It is to be hoped that from the high ground this Society has taken in regard to nostrums and nostrum advertising, it will not, even by inadvertence, depart.

Yet, as has been intimated, all these dangers are but temporary; they are incidents marring what is otherwise a steady advance toward science in therapeutics. The cellular pathology gave us definite knowledge concerning morbid processes and their results. The bacterial etiology has led by its further development to the correction of its own errors, so that now in the studies of the products of bacteria and their changes in character and power in various culture media and under diverse environment, and more especially in the investigations into the reaction of the organism chemically, physically and vitally to their invasion, we are beginning to have the basis of at least a working hypothesis of infection and immunity, with much light upon the processes of normal recovery; and these developments in scientific pathology together with the advances that have been made in physiology and especially in the study of normal and morbid metabolism, are leading to the establishment of broad generalizations concerning disease and recovery on which a rational therapeutic science may be built.¹ Meanwhile the advances in chemistry and chemical pharmacology not only give us in the present new and powerful agents in treatment, but by the particular relations which certain molecule groups are found to bear toward physiologic reaction and toward effect upon symptoms, promise for the future an important and exact datum for the selection of chemical remedies under given conditions of disease. A suggestion of the weightiness of such datum is afforded by those noteworthy experiments in which changes in the chemical constitution of the media in which the ova of echinoderms have been placed, have been found to influence the development of the larvæ, even to the apparent reproduction of healthy adults from unfertilized eggs.

¹ I have discussed this subject at greater length in my address before the Medical and Chirurgical Faculty of Maryland: "Some Thoughts Concerning Disease and Recovery in their Relation to Therapeutics." Proceedings, etc., Baltimore, 1896. *The Therapeutic Gazette*, September 15, 1896.

But while we await the full fruition of these various lines of investigation, there are, nevertheless, certain important facts already available, not only in the therapeutic art, but also in the beginnings of the therapeutic science.

Recognizing in the living unit, known as the cell, the basis of all living organisms, we must look to its constitution and to its powers, as shown by its reaction to environment, for the explanation of the structure and the powers of the developed organism, even of so complex an organism as the human body with its great nervous development. This applies to pathology as well as to physiology; for the same structures, powers, qualities, susceptibilities that determine normal reaction to normal environment—or health—likewise determine normal reaction to abnormal environment—or disease.

While the modern confirmations of Elsberg's doctrine of the continuity of bioplasm modify the old cellular theory in respects that we need not here touch upon, for our purposes they merely emphasize its important lessons in showing the interdependence of all tissues, organs and functions. This, too, is the lesson finally emerging from the discoveries and theories of Weissmann. Though the original cell divide and redivide, its impress remains upon all its progeny and the developed adult man contains no structure and no function that was not potential in the fertilized ovum.

Division of labor, specialization of structure and of function, have caused and are illustrated in the differing tissues and organs resulting from the unfolding of the ovum. These having assumed, during the long ages of evolution, certain forms, dispositions and relations toward each other and the environment, such dispositions and relations tend to become permanent, constituting the harmony we term health. Disturbed by environmental change or internal failure, the organism seeks to restore them and this *vis medicatrix naturæ* gives rise to certain unusual manifestations that mingle with the manifestations of disturbed order; the whole series of disturbances and compensations constituting the symptomatology of disease. All symptoms, therefore, are not morbid; on the contrary many are evidences of salutary reaction. Disease and recovery are one continuous vital process. Thus it becomes necessary for the physician as therapist to make, not only a clinical and pathologic diagnosis, as accurately as the state of science and his own skill permit, but also a therapeutic diagnosis:¹ in order to determine which of the

¹ Concerning the therapeutic diagnosis there is much more to be said; part of which I have published in my Dartmouth lectures on "The Principles governing the Selection of Cardiac Medicaments;" *N. Y. Med. Journal*, Nov. 29 and Dec. 6, 1890.

symptoms may indicate a tendency toward impairment of the natural order and thus invite opposition or modification by art, and which indicate a tendency towards restoration of the natural order and thus invite rather encouragement when present and invitation or imitation when absent. No better illustration can be found than febrile temperature,¹ which Hippocrates from his empiric observation taught was an indication of the attempt of nature to bring about recovery, but which only a few years ago modern physicians were fighting with depressing drugs. In those recent laboratory observations which show that the products of the pneumococcus after having been exposed to a temperature of 41° to 42° C. for three or four days or to a higher temperature for a shorter time, will, when injected into the blood of animals, soon bring about the production of antitoxic substances even to complete immunity in three or four days; while, if unsubjected to such heat, the antitoxin will develop only after some fourteen days of fever in the animal, we have at least a suggestion of a general explanation of the utility of fever heat; and a confirmation of the opinion that some clinicians have frequently expressed that in pneumonia at least, it is often unwise to try to reduce temperature.²

So, too, in the demonstrated abstraction of sodium chloride from the serum in the process of neutralization of toxins, in the observations showing that dilution of certain antitoxic or alexic serums can be made without loss of power if sodium chloride solutions be employed, and considering in this relation the clinical observation of the excess of chlorides in the urine in pneumonia, we have a partially empiric, partially scientific foundation for the use of physiologic salt solution in the toxemias.

The antitoxins of diphtheria and of tetanus, the neutralization of snake-poisons by "antivenine" and by bile, point to the possible development of other natural means of protection or cure in other acute infectious and toxic diseases. Even the failures of tuberculin and its modifications are items of progress; for the differences in the essential processes of tuberculosis and the acute, transitory infections are thus emphasized. But even more suggestive than these are the demonstrations of the powers of the internal secretions dating from Murray's happy experience with thyroid extract in myxedema and not yet culminating even with the demonstration of the wonderful properties of the supra-renal gland.

¹ See also my lecture on "Some of the Therapeutic Relations of the Nervous System;" *Therapeutic Gazette*, March, 1891.

² Personally I have seen the hot bath produce free sweating, followed with hypodermoclysis of normal salt solution do great good in some cases of pneumonia.

That in the not too remote future, we shall have substances of laboratory production, replacing or supplementing the antitoxins and the antitoxin-provoking substances obtained from animals, and even resembling in some degree the extracts of animal tissues and secretions, is not too much to hope. But, even beyond these agencies, and in their absence, there lies a great undeveloped field of therapeutics in which the workers are too few and the results not sufficiently studied with scientific exactitude. I mean those measures which for want of a better term, I have called "physiologic therapeutics," and of which having spoken at length so often, I will not now weary you with any elaboration. But in continuance of the thought expressed a short time ago, concerning the powers of the cell, the development of the organism by action and reaction with its environment and the tendency of the order thus constituted to persist, I may at least suggest that those influences which have been most potent in bringing the body and mind of man to their present state should likewise be among the most potent influences for the maintenance of man's body and mind in health, and for their restoration, when disturbed, to normal conditions.

Sunlight, electric action, heat, cold, air, water, food, exercise, rest and the animal, mental and spiritual emotions have been among the factors through which inanimate material has become living, living material has organized into cells, and cells have developed into succeeding forms, higher and higher, physically, mentally and morally, until at last the man has appeared "but little lower than the angels."

By the intelligent application of similar factors, including the emotions, the physician can do much towards restoring the body and the mind diseased. Hydrotherapy has not its sole application in the Brand bathing of typhoid fever; tuberculosis is not the only disease in which the building up of vital resistance by food and air and sunlight and climatic influences brings the final victory to nature; nor are hysteria and neurasthenia the only affections in which rest and proper nutrition and passive exercise and electric stimulation and the mental influence that can be rightly exerted by the right-minded physician, may bring about the restoration of health. The service that Brand has rendered to the victims of typhoid, that Waldenburg and Bremer have done for consumptives, and Weir Mitchell for the hysteric and the neurasthenic, some of us should do for other sufferers. We should not abandon these great agencies, so largely to the quack and the charlatan. In every medical delusion, even in homeopathy and in christian science, there is an element of truth. The extensive experiments made by homeopaths through the use of inert remedies, demonstrated the truth of Bigelow's

teaching of the self limitation of acute diseases ; while the development of anti-toxins, through the irritation of cells by attenuated cultures of bacilli and of their products and the difference in effects of large and small doses of powerful agents, so strikingly shown in the case of suprarenal substance, permit us to see that in the homeopathic reaction theory of cure, there is an adumbration of a scientific fact. So, too, the aberrations of the "christian scientists" emphasize the undoubted power of the emotions, both in producing certain kinds of morbid action and in remedying them.

Therapeutics must progress, therefore, by recognizing that disease and recovery are alike vital processes, to be studied in relation to all the laws of life ;

that the tendency of the natural order, the harmony of functions, the balance of relations, we term health, is to persist and to become reestablished by internal reactions when its persistence and resistance have been temporarily overcome ; so that the forces of recovery come from within, rather than from without ;

that thus the agents provoking disease and the agents used as remedies, must be considered merely as liberators of energy, intensifying or modifying natural processes, but introducing no new power or quality into the operations of the organism ;

that the physical and mental environment as they have been potent in determining the evolution of the animal organism are also potent in determining its order and in assisting to restore order ;

that thus the most active remedial agents the physician can employ are those produced within the animal body itself in its physiological functions and compensations, and in its resistance to the attacking agents of disease ;

that in the use of these agents or others to control, modify or oppose the course of the disease or of special symptoms, or in refraining from all interference, the physician must be guided by a large knowledge as to the significance of symptoms as indications of morbid disturbance, or of salutary reaction ;

that interference having definite object must aim to restore the balance of function, either by exaltation of unduly depressed function and depression of unduly exalted function to the normal levels, or by depression and exaltation of normal functions to the abnormal levels of those altered by disease ; and that while sometimes the one, sometimes the other course is wiser, the choice must be cautious and deliberate.

that certain definite chemical relations between the agents of the *materia medica* and the structures or functions they influence are to be established ;

that all secrecy, as to the nature of remedies used, must be scrupulously avoided and discountenanced ;

and that those measures other than drugs, which have proved so signally successful in certain striking cases, must be studied and developed to the highest point of usefulness.

DISCUSSION.

DR. JOHN H. MUSSER said on behalf of the members of the Philadelphia County Medical Society that he took pleasure in thanking Dr. Cohen for his admirable address, which reflected great honor not only upon the author, but also upon the Philadelphia County Medical Society.

Report and Exhibition of an Appendix from a Severe Case of Appendicitis.

BY MORDECAI PRICE, M.D.

[Reported and Exhibited March 28, 1900.]

The patient from whom this appendix was removed exhibited the symptoms of a most malignant form of appendicitis. The pulse was low and the temperature high. Two years ago, the patient was treated for typhoid fever, but he then, unquestionably, had appendicitis and did not subsequently improve in general health. He was treated lately for intestinal indigestion. For some time, he has been steadily emaciating and has had continuous abdominal pain. About a week ago it was suspected that he was suffering from appendicitis. I saw him on Saturday, five days ago, when his temperature was 104° , his pulse 80. The abdomen was tense, and had it not been for the fact that it was supposed that he had typhoid fever, one year ago, I would have said he had typhoid and was in danger of perforation. On Sunday, his temperature was 104° , his pulse 80 to 90. I operated on Tuesday morning, and the pulse was 100, the temperature being 104.5 . Septic diarrhoea was the only symptom that led me to believe there was pus in that abdomen. When the abdomen was opened, a light colored pus flowed out. My finger came in contact with the appendix, and in trying to deliver the head of the colon I found a hole about as big as my thumb but no appendix. In the hollow of the sacrum I found the specimen now exhibited and it contained concretions distinctly felt. The pus in the region of the appendix was exceedingly offensive and everything in the abdomen was adherent. The adhesions were all thor-

oughly separated, the peritoneal cavity washed out, the appendix removed, its mesentery tied, and the head of the colon closed by grasping the sloughing and gangrenous serous membrane and turning it in and sewing the peritoneal surfaces together with Lembert sutures. This was followed by thorough irrigation. The pulse immediately dropped to 75 and the temperature to 99.5° and 100.° To-night, he is in excellent condition, though not out of danger. If he dies,¹ he dies because the condition was not recognized in time. The appendicitis should have been diagnosed a year ago, and should have been diagnosed when I saw him last Saturday night. I was very skeptical about its being appendicitis before I opened the abdomen. The case has impressed upon me the importance of the maxim, that when in doubt in a case of this kind we should operate.

The Anatomical Basis for the Menopause with Lantern Demonstration.

BY JOHN G. CLARK, M.D.

[Read and Exhibited March 28, 1900.]

In order to determine, definitely, the anatomical basis for the menopause one must go back to the embryology of the ovary to determine its primitive structure, and the histological changes which occur from birth to the menopause. We can assume, without question, that there are no such structural changes taking place in any organ of the body as in the ovary during the active menstrual life of the woman. This is readily understood when the fact is cited that in the new born child there are myriads of ova enclosed in their primitive follicles, of which only an infinitesimal number reach maturity and pass through the ovulation process. The obliteration of the spaces (Graafian Follicles) enclosing these ova is continually taking place and the older assumption that the primitive follicles remain in a quiescent state until the advent of puberty is entirely a misconception. Even before the birth of the child, the follicles are undergoing an active developmental process. These changes, according to my observations, follow a definite law, depending upon the vascularization of the ovary. The five chief branches of the ovarian artery penetrate the ovary at its hilus, where secondary branches are given off which pass in more or less parallel lines to its apex. From these parallel vessels a number of branches are distributed to the cortex or follicle bearing zone; these branches in turn send

¹ On the eighth day the patient was reported rapidly recovering.

nutrient twigs to the innumerable primitive follicles. In the new born child, one may usually observe a tendency to enlargement of the more centrally situated follicles, especially those lying close in against the medullary branches of the ovarian artery. The follicle undergoes enlargement, forming a small vesicle containing the ovum and its surrounding granular cells (*membrana granulosa*). It reaches a certain point in its development, and then undergoes degeneration. During this process, however, the follicle has shown no tendency to mobilization toward the periphery, but has simply undergone concentric enlargement, after which a retrogressive or obliterative process is inaugurated. This failure of mobilization is due to the deep situation of the follicle in the ovary, which prevents it pushing out towards the periphery, the resistance offered by the stroma and the many net like anastomoses linking together the innumerable follicles situated between it and the surface being too great to be overcome. The obliterative process is analogous to the healing of a wound by granulation tissue. The stroma cells undergo hypertrophy, spoke like vessels are projected into this mass of cells and thus completely organize the spaces. After this point is reached, atrophy of the large lutean or connective tissue cells takes place, and a small amount of the remaining connective tissue goes to form a denser ovarian stroma. Throughout the adolescent period, the Graafian follicles are continuously undergoing these obliterative changes. As the age of puberty is reached, the follicles further out in the cortex are approached, and then, the resistance being less in the direction of the periphery than towards the center, they tend to rupture upon the surface. In other words, the equilibrium existing between the central and peripheral forces is broken and the central pressure now being greater, the follicle is naturally pushed towards the surface. About this time, menstruation, which indicates ovulation, is inaugurated. Pflüger has perhaps given the best physiological explanation for this process. He believes that as a result of the combined irritation of the enlarging follicle a cumulative nervous impulse is generated, which acts reflexly upon the sexual nervous centers, and thus inaugurates the menstrual congestion which is analogous to the period of rut in lower animals. An extremely interesting observation, confirmatory of Pflüger's theory was made some years ago by Dr. John Goodwin of Louisville, who noted in two or three cases an ante-menstrual congestion of nevi and varicose veins, and on closer study of these cases he found that this usually occurred from 7 to 10 days before the onset of the flow. This observation has been investigated by Van Ott, who has fully confirmed Goodwin's menstrual wave theory. He has constructed a chart, with a

basal line beginning at the period of greatest quiescence in the menstrual interim, and has carefully studied the various physiological functions of the body, including respiration, temperature, pulse and excretions. Starting at the normal line, or the first day, there is no appreciable change until the end of the fourth day, when there is a gradual rise in the line indicating an increased activity in all of these functions, which reaches its highest point on the eleventh day, or about two days before the onset of the flow. From this time it rapidly drops to the basal line, which indicates the beginning of the flow and then continues to fall for the five succeeding days of the flow; when this terminates the line gradually rises and two days afterwards again reaches the normal, then rises slightly above the normal line, but gradually drops back until it reaches the normal again, as indicated at the first point taken. Thus it will be seen that antedating the menstrual flow, there is a marked congestion for several days.

This physiological law according to my observations may be explained partly on an anatomical basis. Assuming tentatively, that Pflüger's law is correct, it may readily be seen that the cumulative action induced through the growth of the follicles first sets up an irritation, and this in turn leads reflexly to the menstrual congestion. A slide taken from an injected specimen of an actively menstruating woman shows a most phenomenal tortuosity of the vessels within the ovary. Undoubtedly, this excessively tortuosity, which we find in no other organ of the body, has a distinct purpose, and according to my theory, it is to increase the antemenstrual congestion and thus push the follicles towards the periphery, where they rupture.

With this preliminary statement of the physiological basis for menstruation, the explanation of the factors which produce the menopause is easy. The large Graafian follicle, after it ruptures upon the surface, undergoes rapid obliteration through the organization of the cavity by large connective tissue cells (lutean cells). From the very beginning, the law of progression has been followed in the obliteration of these follicles, for those situated nearest the central vascular tree have undergone the cyclical development first. It can readily be seen that with the obliteration of each follicle the stroma of the centre of the ovary becomes permanently denser, and the primitive follicles in the periphery of the cortex are thus further and further removed from their nutrient blood supply. In order that perfect maturation of the follicle shall take place the primitive loop of vessels which surround the follicle in its fetal state, must undergo a most remarkable hypertrophy and hyperplasia, thus being changed from a tiny capillary

wreath to a great cavernous, venous and arterial net. Only a very abundant blood supply can, therefore bring the follicle up to its highest development and rupture.

With the approach of the menopause there is no decrease in the number of the vessels in the center; on the contrary, they apparently increase in size and numbers, but the vascularization of the periphery, in which are situated the only remaining primitive follicles, becomes progressively less and less, until a period is reached when it is not sufficient to induce the normal growth of the follicle. When this point is reached in the life of the woman, symptoms of the menopause begin to appear. Menstruation may cease quite suddenly, or as is usually observed, become gradually more and more irregular and spasmodic and finally disappears. According to my theory, the menopause does not depend upon a central nervous impulse for its inauguration, but is strictly attributable to the local changes in the vascular apparatus of the ovary. Thus we constantly find at this period excessive hyaline and sclerotic changes in the intraovarian vessels, which are purely local processes, and may not occur in the vessels of any other part of the body.

In general, women in this climate cease to menstruate between 42 and 45 years of age, while they are yet in active physical life. It would appear, therefore, that this is a provision of nature, by which ovulation takes place only during the best physical life of woman, while she is most capable of bearing and taking care of her children.

To briefly summarize, therefore, I should say that the menopause is solely dependent upon degenerative and structural changes in the intra-ovarian vascularization, which at first limit and at last abrogate the development of the primitive follicles. Certainly the menopause is not brought about through disappearance of the follicles, for, as I have frequently observed, follicles may still be found in the ovary of women years beyond the menopause, thus in the specimen shown on the screen from a woman 66 years of age, a partially developed follicle, containing an ovum is seen.

The Symptomatology and Complications of the Menopause.

BY J. C. WILSON, M.D.

[Read March 28, 1900.]

The menopause constitutes a physiological epoch not less important than that of puberty. The one marks the coming into existence of the reproductive function with physical, psychical, and moral changes

commensurate with the development of the child into the woman; the other, its decadence. The change is less abrupt but equally profound. The one is a period of rapid and far-reaching evolution; the other of involution not so rapid but fully as widespread. Each is a time of adjustment and readjustment.

The term menopause is somewhat loosely used. It is generally understood as covering the whole period during which menstrual irregularities or definite symptoms occur. This period is a variable one; its average duration is between two and three years. Sometimes there is irregularity with very insignificant symptoms; sometimes symptoms with but little disturbance of the recurrence of the menstrual flow until it finally ceases altogether; more commonly, progressive irregularity, marked subjective symptoms and objective signs of derangement of the health are associated.

Various theories as to the primary cause of the menopause have been advanced. It is probable that the point of departure is in the nervous system and that the derangements are essentially trophic and associated with diminished vascular supply to the affected structures. As regards the reproductive tract, the changes of the menopause are senile. They consist of an atrophy of the reproductive organs. The uterus becomes smaller, the endometrium atrophic, its glandular elements disappear. Similar changes take place in the tubes and more tardily in the ovaries. Prolapse and other displacements of the uterus occur in consequence of loss of elasticity of the ligaments of support and atrophic changes in the perineal body. The vagina becomes progressively narrower and shorter; its rugæ disappear and its mucous membrane becomes anæmic and grayish. The external genitalia undergo similar changes.

Equally various are the theories concerning the symptoms. These theories have been admirably summarized in a recent paper by Galbraith.¹ "Oliver believes that the catamenial flow eliminates from the body substances whose presence in the blood would exert a deleterious influence on the animal economy." Christian Martin holds "that the symptoms of the change of life are produced largely by a condition of instability and increased excitability of certain other cerebro-spinal centres directly brought about by failure of the menstrual centre," and that "it is probable that the ovaries, like the liver and thyroid gland, modify the blood circulating through them and add to the blood some peculiar product of their metabolism. It may be, that some of the climacteric symptoms are due to the loss of this substance from the

¹ Amer. Gynec. and Obstet. Journ., Vol. xv, July-December, 1899.

system." "The etiology and pathology of the menopause lie in the sympathetic or ganglionic nervous system. It is by the breaking up of the harmony of previous processes that nervous phenomena are produced." (Galbraith.) The last of these views appear to be in close harmony with the facts. Women of strong constitution and previous good health usually pass through the menopause with least disturbance. With them the readjustments of this period are often affected with trifling perturbations: On the other hand, delicate women and those of neurotic constitution suffer most. According to Tilt¹ "The best way to avoid the dangers of this critical time is to meet its approach with a healthy constitution. A marked want of strength prevents the regular succession of the vital phenomena by which all critical periods are carried on, and as the change of life is marked by debility, when this is grafted on constitutional weakness, loss of power will be of long duration. All complaints remain chronic, because there is not stamina enough to carry them through their stages." Dusourd,² whose practice lay in an agricultural district in the south of France, believed that peasant women suffer but little at this period, assigning as a reason that their health is generally good when the menopause comes on and they are little liable to nervous disorders. On the other hand the menopause is attended with troublesome symptoms among the poor of large cities.

With reference to the sexual life, it has been observed that unmarried women are less liable to the graver disturbances of this critical period than those who have borne children. Women who have suffered at the time of puberty and at the menstrual periods and those subject to disorders of the pelvic viscera are especially liable to trouble during the menopause. The same is true of those who have had repeated miscarriages.

The principal symptoms may be grouped as follows: Those referable (a) to the nervous system; (b) to the circulatory system; (c) to the gastro-intestinal system.

(a) The symptoms referable to the nervous system vary from mere nervous irritability with occasional flushes to grave forms of hysteria and insanity. The nervous irritability frequently manifests itself in an agitated restlessness, dissatisfaction on the patient's part with herself and her surroundings, the feeling of inability to discharge the duties of every-day life satisfactorily, and vague apprehensions in regard to the future. The flushes consist of paroxysmal sensations of fullness of the head with dilatation of the blood-vessels of the face and neck, accom-

¹ "The Change of Life in Health and Disease," 1892.

² Quoted by Galbraith.

panied with dyspnoea and smothering sensations. These attacks occur at irregular intervals and are brought about by exertion and emotional disturbances. Headache is a very common symptom during the menopause. It is usually dull and general, sometimes referred to the occipital region. It is commonly more severe in the early part of the day. It may be attended with the dragging pain of neurasthenia at the nape of the neck and between the shoulder blades, and it is often accompanied by vertigo. Sometimes the headache takes the form of brow pain. In all instances of persistent or frequently occurring headache at this time of life, errors of refraction are to be thought of, especially those due to a developing or rapidly increasing presbyopia. Patients suffering from migraine are liable to more frequent attacks during the menopause, but may as a rule look forward to relief after the climacteric. In a case seen in consultation with a medical friend a few years ago, mild epileptiform attacks occurred after the menstrual life had ceased, at intervals corresponding to the former attacks of migraine. Attacks of vertigo not infrequently come on suddenly, sometimes in the street.

Forms of paresthesia are not uncommon. Tingling in the hands and feet and sensations of fluttering in the epigastric region or in the abdomen occur. Waking numbness is frequently encountered. It seems to be almost exclusively a symptom of the menopause. On awaking from sleep the patient experiences a disagreeable sensation of numbness in the hands and arms; very rarely in the feet. Neither motion nor tactile sensation is disturbed. Ordinary movements can be performed with precision, yet the patient is tormented with the fear of becoming paralyzed. Commonly the sensation passes off in the course of a few hours to recur again upon the following day. More rarely it persists, becoming less intense toward night. Pruritus of the anus and of the vulva are among the most annoying and intractable of the nervous symptoms. In some instances the latter is due to glycosuria. Neuralgias of various nerve distributions frequently occur. Clavus, supraorbital neuralgia, intercostal neuralgia with pain in the precordial area, and sciatica are the more common forms. Hysterical manifestations are frequent and some of the most troublesome and distressing forms of hysteria are met with at this period of life. Disorders of sleep are common. Startings during the predormitium. Disturbed and broken sleep and annoying dreams frequently occur. Actual insomnia is common and troublesome.

(b) The symptoms referable to the circulatory system consist of heart consciousness, precordial pain and palpitations not infrequently associated with flushes. Irritable heart sometimes occurs. Errors of diagnosis may be made in this connection. Quite recently I saw a case with

well marked symptoms of cardiac irritability ascribed by the patient herself to the fact that menstruation had become scanty and infrequent. It subsequently developed that the cardiac condition was due to strain, the result of running to a train, and followed by prolonged faintness and breathlessness.

Tachycardia.—Increased pulse frequency is common. Actual tachycardia occasionally occurs and in some instances paroxysmal tachycardia has been noted. Various hypotheses have been advanced in explanation of this phenomenon. It would appear, however, that the view of Nothnagle is correct, namely, that the condition is due to the impairment of the functions of the inhibitory fibres of the pneumogastric. In this respect, the tachycardia of the menopause resembles that of neurasthenia.

A tendency to hemorrhage frequently develops during the menopause. Blood loss may occur in consequence of various conditions which give rise to it under other circumstances, such as pulmonary tuberculosis, valvular disease of the heart and changes in the blood. Blood loss from the genital tract may be due to local lesions, such as polypi, uterine tumors, erosions and ulcerations of the os and malignant disease of the os or endometrium. In all cases in which excessive bleeding occurs or persistent oozing of blood, a careful examination of the pelvic organs must be made.

(c) The symptoms referable to the gastro-intestinal tract include various functional disturbances of the stomach, gastric neuroses, irregular and capricious appetite and especially constipation.

Among the conditions which not infrequently occur as complications of the menopause are glycosuria, to which attention is often attracted by pruritus vulvæ, forms of nephritis which are peculiarly liable to develop at the time of life at which the menopause occurs, arthropathies such as gout and arthritis deformans, the insanities, alcoholism, drug habits and obesity.

The menopause artificially produced by the removal of the appendages very often takes place without the development of the group of neurasthenic symptoms which accompany this change under natural conditions. Such symptoms as occur are frequently masked or subordinated to the post-operative symptoms or to the continuing symptoms of the condition for which operation has been performed.

A study of the symptomatology of the menopause makes it clear that the morbid phenomena are allied to those of neurasthenia and that they are the evidences of inability on the part of the nervous system to stand the strain and stress of a period of profound physiological disturbance and readjustment. To account for them, it is not necessary to invoke

the agency of a hypothetical internal secretion of the ovaries or to assume the accumulation within the body of a hypothetical toxic principle previously thrown off during menstruation. If these hypotheses were correct, the better the previous health and the greater the functional activity of the reproductive organs, the more profound would be the derangements at the menopause and the greater the disturbance of health. In point of fact, the reverse of this is the case and it is the neurotic and exhausted woman, worn out by frequent child-bearing or repeated miscarriages or persistent uterine disease, in whom the symptoms accompanying the menopause are most marked and most distressing. Add to these conditions moral causes, the disappointments of middle life, sickness in the family, anxiety, the introspection natural at the time of the menopause, the apprehension as to its effects upon the health, the realization that it marks the beginning of old age, and it is not difficult to understand that in a considerable proportion of women the menopause is not only a physiological but also a pathological epoch.

It is no part of this communication to consider the details of treatment. It has, however, been well said by Galbraith that the time to begin the preparation for the menopause is in childhood.

The Psychoses of the Menopause.

BY JOHN B. CHAPIN, M.D.

[Read by Invitation, March 28, 1900.]

The psychoses of the menopause is one of the interesting themes proposed by your board of directors for consideration this evening. As I was not consulted about the topic assigned to me, I, in accepting the invitation of the chairman, did present what might be called a plea for a dispensation for liberty, for it seemed that a request was made to write of conditions that have a stronger place in the popular estimation than in actual clinical experience, so that if others who are present shall take issue with what is now said, you may then have the double advantage to be derived from other views.

The term "Psychoses of the Menopause" is understood to comprise the insanities that are caused, or occur, at the close of menstrual life in women. The term may be good enough, and a convenient one to use, if its meaning is intelligently accepted, and within proper limitations. It is not to be accepted, and it is an error to suppose that the insanities that appear at the menopause have special mental characteristics that

are present only in women at this period of their lives, or that they differ from mental attacks at other periods of their lives, or in the opposite sex. To emphasize the psychoses of the menopause is an instance of an attempt to classify and describe insanities as distinct entities due to causes alone, and to open the door farther to an endless nomenclature and confusion as to the nature of insanity itself.

In both sexes, excepting the reproductive functions and organs essential to the continued existence of the race, there is an exact similarity in the brains and all other organs. Both sexes have the faculty of intelligence, sensory endowments, emotions, will-power, and memory. It is the change from the orderly and normal exercise of these faculties, which may arise from all of the experiences of life, that constitutes the condition commonly called insanity. Aside from some peculiarities that are characteristic and distinguish each sex, insanity in man is similar to insanity in woman, because it is the disorderly action of mental faculties that are common to both sexes. As the brain structure and cells, and the manifestations of various forms of insanity in each sex are similar, and when acted upon by like cause the results are the same, so we may reverse the reasoning and conclude that when insanity has appeared, it has been induced by some lowered state of the general bodily health, the quantity and quality of the blood sent to the brain, and the degenerations proceeding from trophic changes, rather than by the absence or possession of any one of the organs of reproduction having only a sympathetic relation with the function of mentalization.

The menstrual life of women is commonly said to be about thirty-four years, beginning at sixteen and ending near the age of fifty. The function is a physiological and not a pathological condition, and it is just as normal a state of things that it should end, as it is that it should begin.

This period of thirty-four years is the active portion of the life of woman. It begins and ends with two climacteric crises, between which she undergoes the sorrows of maternity, or experiences the worries—even at times bearing her share of the struggles for existence—and the results of the “wear and tear” incident to living and advancing age, through all of which she may pass without damage to mind or body. Superadded, however, to the ills that come from various causes of an extraneous character, a certain proportion of both sexes have a neurotic heredity, or an inherited predisposition to mental disease, so that life begins on a lower plane, or on a descending plane. Every inheritance of the kind is a form of degeneration from a higher to a lower plane, lessening the power of resistance against the tendencies to mental dis-

ease and unusual strains at every period of woman's life, and at the menopause. Clinical experience shows that the risk of insanity at the menopause, while it is believed to be largely exaggerated, is limited mainly to those who have a neurotic or mental heredity, and those who at the period of adolescence or during the menstrual life have had attacks of insanity. The transitions from the menstrual life which have been established perhaps for thirty years, to the new conditions of the menopause, are likely to be attended by changes in the body-weight, sympathetic disturbances, groundless perturbations, and even some psychic manifestations of an unusual character, but they need not alone or together arouse serious apprehensions. That the change in itself is a frequent cause of insanity does not appear from observation. Of the assigned causes of insanity in women in 8320 admissions to several hospitals for the insane, reported in 1899, twenty-two in a thousand, or 188 became insane at the menopause. These "causes" are to be accepted, however, with the qualification that they are called "assigned causes" and are often somewhat clouded by speculations of a personal character. Of the dread or risk of insanity at the approach of the menopause in a person ordinarily of sound health and inheritance, it may be said that they have no better foundation than a popular delusion based on borrowed fears.

If, on the other hand, to the neurotic or insanity—heredity and recurrent attacks of insanity during the menstrual life from which perhaps complete recovery has not taken place, there be added a neurasthenic condition, sudden shock arising from domestic affliction or financial distress, causing insomnia, sorrow, and depression, then the menopause may become a contributory cause of insanity.

The psychoses of the menopause comprise hypochondria, simple melancholia, or prolonged mental depression without delusions; melancholia with depressing delusions; melancholia with agitation and motor excitement; or melancholia with stuporous conditions; acute delirium of grave import; or those alterations of character developing gradually, attended by mental and moral degeneration, closely allied to those cases described as paranoia. There is a general agreement that melancholia is the most frequent form of mental disease at the menopause, and that acute mania rarely occurs. If the melancholia is prolonged for a year or more, and the patient becomes negligent of her habits, dirty and destructive, incoherent in conversation, with hallucinations, a further mental degeneration has taken place, and the prognosis is unfavorable. In other forms of melancholia the prognosis is favorable for recovery if the patient will take food, tonics, and in other ways co-operate with the

physician. It is not the purpose to enter upon the clinical account of melancholia, or any form of insanity occurring at the menopause, as they do not differ from the same affections in each sex and at other periods of life in their course and ending.

During the past few years, a number of women have been received in the Pennsylvania Hospital for the Insane who had been operated upon for the removal of the sexual organs, the majority of whom subsequently had melancholia with many of the usual symptoms attending the menopause, which had been anticipated by surgical interference, showing that whether the grand climacteric is brought on in the course of nature, or by the methods of science, the form of mental results is quite similar when any have appeared.

It has been observed that many women who have been melancholy, or threatened with insanity at the menopause, have at the age of puberty also had serious neurotic or mental symptoms. This circumstance has been cited on which to predicate a probable recurrence at the menopause, but these statistics of the Pennsylvania Hospital show that between the ages of fifteen and twenty, embracing the beginning of the menstrual life in women and the age of puberty in men, 284 men, and 276 women were admitted. Between the ages of forty-five and fifty-five, covering the usual period of the menopause, 975 men, and 876 women were admitted into the same hospital. From these data it would appear, as far as they indicate anything, that at both of the periods named more men than women become insane. If the menopause alone was a serious and important factor in the production of insanity, it would so appear in the tables. I borrow from a paper entitled, "An Analysis of 3000 Cases of Melancholia" admitted into the Pennsylvania Hospital for the Insane, prepared by Dr. S. Weir Mitchell, which throws a side light on the subject we are now considering. Admitting that melancholia is the most frequent form of mental disease that occurs at the menopause, it would be a logical conclusion that a much larger proportion of cases of this form would occur at this period. The exact percentage of cases between the ages of forty-five and fifty was for men, 20½; women, 21½—or practically there was no difference in each sex.

It can be stated as a clinical conclusion that women who become insane at the menopause, as a rule, possess a neurotic and mental heredity, or have already suffered from recurrent insanities during the menstrual life, and are rendered unstable and peculiarly liable to a fresh attack at any crisis in their lives. The climacteric at the end of the menstrual life is approached by many with groundless apprehensions of some impending calamity; depression of the vital and physical powers

at a time when there is a readjustment of activities, and the nervous forces take new directions to meet different conditions of life. In this sense it is a crisis and a cause of the psychoses of this period just as depression of the vital forces, strains, worries and shocks produce insanity at other periods of life, and in both sexes.

The critical listener may correctly infer that while the writer has undertaken to present something about the psychoses of the menopause, and admits the term has some conveniences, he has further attempted to show that outside the narrow limitations named there is no sufficient clinical experience to warrant the recognition of a distinct class of insanities as due to a normal ending of an animal function that is universal. If the writer is correct, then it is the province of our profession to remove the unfounded perturbations that worry and distress so many persons as they approach this period of their lives, and to hesitate about the performance of all those experimental operations that may precipitate it.

SPECIAL DISCUSSION.

THE CARDIAC MANIFESTATIONS OF THE MENOPAUSE.

DR. JAMES M. ANDERS, in his remarks, omitted consideration of the minor circulatory manifestations dependent upon vaso-motor disturbances, such as the annoying and even distressing heats and flushes, coldness of the extremities and the like. On the other hand, he dealt only with the cardiac manifestations proper, but said it must be clearly understood that the aforementioned symptoms and other rarer features are often either respectively or unitedly in association. By the term menopause as here employed is meant the period between normal menstruation and a variable time after the cessation of the menses. He thus defined the change of life, because the most pronounced disturbances have been observed prior to total cessation of the menstrual function—the period of irregularity.

Although in his experience he recalled many instances of cardiac derangement during the menopause, he confessed that he had not hitherto given special attention to the functional heart-disturbances of this transitional period. Neither has the subject been thoroughly studied by others in the past. There are pathological conditions special to the normal change; "there is a focus of irritation in the genitals causing disturbance in the sympathetic system" (Napier) and tending to vaso-motor and cardiac derangements.

The subjective symptoms presented by the heart attending the change of life may duplicate those of most of the functional and organic diseases of the heart. Hence, before ascribing any cardiac manifestations in a given case to the menopause, all other possible determining causes must be excluded. By physical examination of the heart the presence or absence of structural disease must be determined with great care. Moreover, many

cases, in his own experience, in which the cardiac conditions were not traceable to adequate causes, acting directly or indirectly, other than change of life, persisted after the original etiologic factor and its more obvious symptoms had apparently disappeared.

It is also highly desirable to differentiate the symptoms due to the menopause, from those reflex neuroses due to actual pelvic lesions. It is probable that a more critical study of cases of heart-disturbance, during the period of the change of life, would permit of their classification as reflex affections dependent upon actual pathologic processes in the uterus and its adnexa, although, the well-defined instances of the latter class are by no means numerous. The speaker had at that time under his care a lady who has a pelvic tumor-mass of unknown nature, and who has reached the climacteric; she suffers from mild precordial pains, which at intervals is associated with nervous palpitation. The cause of the symptoms in this case was probably a composite one, which scarcely admitted of analysis, and this is even more true of the majority of instances of tachycardia that arise during the menopause. Surely, the fact, that all cardiac derangements met with during the climacteric, are not to be attributed to this cause deserves to be emphasized.

He has a fixed belief that, in the majority of the instances in which distinct cardiac manifestations occur, a previously existing neuropathic tendency acts as an underlying cause. Although largely speculative, the physician must also attempt to discriminate between cardiac symptoms produced by the menopause and certain independent nervous disorders. It was beyond the province of the discussion to enumerate the many factors that contribute to the neuropathic origin of the various forms of functional cardiac disturbance. Neither could he consider the question of the differential diagnosis of the various special forms that bear either a close or superficial resemblance to the cardiac phenomena excited by the menopause.

The principal error in diagnosis is the assumption that the given case is one of cardiac derangement due to the climacteric simply from its occurrence during this somewhat elastic and variable period. It is to be recollected, that it is only in cases of cardiac disturbances in which other causes may be excluded, that we can feel assured that the menopause is even the most active factor in their etiology.

Among the individual conditions that he has noted is palpitation. In some instances this symptom has assumed the form of a temporary fluttering. A few of the most pronounced cases of palpitation during the menopause occurred in women who passed through the change early, or in whom the menopause had been prematurely induced by operative treatment. It is most apt to manifest itself at periods corresponding to the time of the normal menses.

Cases of tachycardia are met during the change of life. His note book furnishes the history of two cases, as follows:

CASE 1.—W. H. B., aged 54 years, the mother of two children, is of good social position, is without hereditary family taint, and had enjoyed exceptionally good health up to the 45th year of her age, when menstruation be-

came irregular and less frequent. This function did not entirely cease however, until she was 52 years old. From the 45th year until the present, attacks of typical tachycardia lasting from one to two or more hours, during which the heart-rate leaped to 200 per minute, occurred at intervals of 2 to 3 months. Since menstruation has ceased, the attacks have diminished both in severity and frequency. The patient does not perceive the increased rapidity of heart action, but there is a sense of impending danger.

CASE 2.—A. T., age 48 years is neurasthenic and childless; she has a family history of tuberculosis and gout; she had acute articular rheumatism and, later in life, subacute attacks of gout; at the age of 38 she developed cysts of the ovaries, for which double oophorectomy was performed. Within the next 6 months typical tachycardia appeared; this recurred at intervals of 3 to 4 months during the next decade, or until about one year ago. The seizures lasted about one hour, and the pulse-rate changed from 180 to 200 per minute. For six months after the last attack of heart-hurry, she experienced pricking sensation in the skin of the extremities and also experienced flushes of heat associated with smothering sensations. Throughout the long course of this affection, the patient was greatly annoyed with flushes of heat and, at times, with cold extremities. During the last six months she has enjoyed excellent health, although the evidences of neurasthenia are still present.

He recalled several additional instances of tachycardia occurring about the time of the menopause, but of these, he had kept no record and the details were too indistinct to be related with any degree of accuracy. Tachycardia does not belong exclusively to the period of the menopause, and it is probable, that, in most instances, there is an under-lying neuropathic state to which a predisposing influence may be assigned. At all events, this was true of the cases reported above.

Bradycardia was present in one of his cases. The patient J. S. W., age 49 years, gave a family history of organic heart disease and of Bright's disease. She had nervous prostration 7 years prior to coming under his observation. While in the stage of irregularity, at the age of 45, she developed several attacks of bradycardia, occurring at long intervals, and each lasting 3 to 4 hours. The pulse-rate ranged from 40 to 50; prostration was marked, but the mind remained clear. Physical examination of the heart proved negative in its results, although the contractions were feeble. Symptoms of vaso-motor disturbance and menorrhagia leading to marked secondary anemia as the consequence, were associated from time to time.

He had seen a few cases in which marked arrhythmic action of the heart appeared. In one case, cyclic irregularity in the force and volume of the pulse was noted. The woman was obese, weighing 190 lbs., hence there may have been a combination of causes at work. Since then he has noted somewhat similar arrhythmia in persons subject to fatty-overgrowth. Here may be mentioned the fact, that all forms of cardiac derangement have seemed to assume an aggravated form in cases in which the climacteric occurred prematurely, and this has been especially true of the cases that probably

resulted from pelvic disease. The premature climacteric seen in the obese is sometimes accompanied by palpitation, although more commonly, in his experience, by arrhythmia. Whether the obesity in these cases is the cause of premature cessation of menstruation as Kisch contends or the polysarcia is the consequence of arrested menstruation, he was not prepared to state, but he had seen, in a few cases, marked improvement in the cardiac phenomena and a lessening of the bulk and weight of the body, after reestablishing the suppressed menstruation.

Arrhythmia is often temporary. Thus during the period of irregularity in the appearance of the menses arrhythmia may develop about the time that normal menstruation should occur. It may be associated with palpitation and it was during an examination of the heart for this symptom that he first detected the arrhythmia. No patient, however liable to complain, has ever come under his care for arrhythmia alone. Finally, he said that apart from the cases of tachycardia, no instances of cardiac disturbance during the menopause, of grave character, had come under his observation.

GENERAL DISCUSSION.

DR. F. X. DERCUM said that there are no neuroses that are characteristic, just as there are no psychoses that are characteristic of the menopause. The menopause is the period of the beginning of involution not only of the sexual functions, but also of the general powers of nutrition. It is not surprising, therefore, that neurasthenia and other nervous disturbances should make their appearance. There is nothing characteristic of neurasthenia of the menopause. It presents the symptoms of fatigue neurosis with some additional psychical factors not present at other periods. The woman, as a rule, is excessively timid and fearful. She knows that it is a period of importance and has often exaggerated notions as to what it may mean for her. The neurasthenia of the menopause is sometimes accompanied by the fear that a pregnancy has occurred late in life. Then there is the neurasthenia, which is exceedingly grave and profound, which resembles the neurasthenia terminalis, and the neurasthenia seen in old age, when the reparative powers are very low. As Dr. Wilson has already mentioned, there are present paræsthesiæ, especially of the hands and feet, more especially of the fingers; the condition has received a special designation, akroparesthesia. It is, however, merely a symptom and not a disease.

The hysteria, which is sometimes present, exhibits no special peculiarities, but there are the ordinary stigmata, the usual hyperæsthesiæ over the back and shoulder blades. The hysteria is persistent and troublesome, just as is the neurasthenia, and is liable to recur even when it has been in abeyance, especially, if the subsidence of the menopause pursues a slow course and if there is recurrence of ovulation at long periods.

Sometimes the neurasthenia or hysteria is complicated by a spurious pregnancy, a pseudo-cyesis. This pseudo cyesis sometimes forms the basis of a

painful delusion in the melancholia, which, as Dr. Chapin has said, may ensue during the menopause.

DR. JUDSON DALAND reported a case under observation, in which, regularly, every twenty-eight days, a woman, aged forty-seven, complained of severe gastric pains with nausea and occasional vomiting. The pains were so severe that they were mistaken for attacks of gall-stones. Immediately after an attack, the patient would sit down at dinner and partake of ordinary food with a perfectly normal appetite and digestion, whereas, during an attack of pain the simplest food was associated with gastric distress. The periodicity of these attacks, the absence of disease or disturbance of the gastric functions between the attacks, and the association of flushings, sweatings and flashes of heat convinced him that these gastric attacks were at a time which would have been a menstrual period, if the patient were not passing through the menopause. He inclined to the opinion that these attacks of gastric pain and distress are rarely present as symptoms of the menopause.

DR. J. M. TAYLOR said in supplement to the remarks of Dr. Dercum that the so-called psychoses, as well as the neuroses of the menopause, are seen principally among that class of people who have time and leisure to think about them, and that relatively few are seen in the dispensaries.

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Report and Exhibition of a Case of Empyema.

BY LEEDOM SHARP, M.D.

[Reported and Exhibited April 11, 1900.]

The case is interesting on account of its history. It is one of empyema following pneumonia. Aspiration was done at the house of the patient and a quart of pus taken from the wound. The patient did not get on well and was finally taken to a hospital and there stayed a month. Free incision was made in the ribs, the wound properly washed and tubes inserted. He left the hospital unimproved, and there was a steady loss of flesh. He went to a neighboring dispensary where he was treated for four or five months with tubes being inserted and being thoroughly washed out but there was no apparent cessation of discharge which was more of a serous nature than of pus.

He came under my care in October, 1897. The breathing on the left side was much restricted, almost all being done on the right side. I told him that he could not be cured without an operation, which was accordingly done. The very interesting part of the operation was that when the ribs were resected there was found instead of a pus cavity two or three drainage tubes that had been previously lost. Upon inquiry the patient said that the tubes were lost while he was in the hospital, presumably during the night and that they had been thought to have been taken up in the sweepings. After operation I directed him to breathe upon a bottle in order to expand his lungs. He has now almost complete use of the left lung.

Three ribs were removed. At the time of operation his weight was 120 pounds, and it is now 168. He has been able to return to his business as carter and is able to lift heavy weights. He has no pain; breath sounds are low down and he has marked expansion.

Report and Exhibition of a Case of Elephantiasis of the Leg.

BY DAVID RIESMAN, M.D.

[Reported and Exhibited April 11, 1900.]

Mr. President and Gentlemen : The patient whom I take the liberty of showing you this evening was born in England thirty-four years ago ; he came to Philadelphia at the age of six, and has resided here ever since. At eight he had measles followed by abscesses below the left angle of the jaw and on the left side of the neck. At the age of seven-teen or eighteen he had a severe attack of typhoid fever, apparently without sequelæ. Ten years later he had pneumonia in a mild form. Eight years ago he fell down the cellar steps and bruised his right side in the region of the flank, but not severely. He has never had any venereal disease, and has been a teetotaler since his nineteenth year. He was married at the age of twenty-two, but has separated from his wife. They had two children, one of whom died of marasmus ; the other is perfectly well.

The striking condition of the man's right leg, which you can readily see at a distance, and which is quite well shown in the photograph, dates back about four years. The year before he had had a slight enlargement of both legs which yielded to a patent medicine, but this remedy failed a year later, when the right leg began to enlarge. Just before the first swelling he had a trivial sore of some kind near the right knee, which healed promptly.

The swelling started with sharp pains in the right thigh and leg, and began below the knee, gradually travelling up the thigh. Pain was always present, but at no time was there any redness or heat. Both feet were very cold about the time the swelling began. In from four to six weeks from the time the trouble commenced the leg had nearly attained its present size, and there has been but little change in it since that time. Pain is a more or less constant symptom and is greatly influenced by atmospheric changes. There is no difficulty in walking nor in standing. The left leg is subject to almost the same pains as the right. The man's chief complaint when he came under my care was headache, frontal and ocular, which set in about the time the leg began to swell and is worse when he is at work. In addition he has occasional pains in the abdomen, also worse when he is working.

He is employed in an iron foundry. Headache and abdominal pains are common among the workmen at the foundry, and are attributed by

them to their being near the fire and handling the glowing steel ; also, especially the abdominal pains, to the drinking of large quantities of ice water, of which the patient himself drinks inordinately during working hours. While at work the handles of a heavy pair of tongs, weighing from ten to fifteen pounds, rest across the upper third of the right thigh,



the total pressure, including the weight carried by the tongs, being from ninety to one hundred pounds.

Upon examination you will notice the enormous enlargement of the right leg, giving it the characteristic appearance of elephantiasis. The swelling is firm, tense, and elastic. The skin is cold and dry, and below the knee dusky-red in color. These particular phenomena vary, how-

ever, at different examinations. There is no pitting, except to a slight degree below the knee. In the thigh the tissues are not quite so brawny as in the calf, where they feel almost board-like in firmness. There are two deep grooves or furrows on the inside of the leg in the region of the calf, the first 27, the second 34 cm. below the knee. The growth of the hair is much less marked on the right leg than on the left. Below the knee there are numerous hard, pea-sized papules, generally whitish, a few reddish in color. At times these papules become vesicular and burst, discharging a little serum. There is some enlargement of the inguinal glands, more marked on the right side. It is not great, however.

Rectal examination reveals nothing abnormal in the pelvis. On the 15th of February the measurements of the legs were as follows:

	Right Leg.		Left Leg.			Right Leg.		Left Leg.	
Top of thigh .	57	cm.	50	cm.	Below calf .	41½	cm.	23	cm.
Middle of thigh	57	"	45	"	Above ankle	40	"	20	"
Above knee .	52½	"	37½	"	Ankle .	36	"	23	"
Knee .	45½	"	36	"	Instep .	28	"	24	"
Calf .	51½	"	31	"	Tarsus .	25	"	22½	"

A month later the measurements were decidedly less, the reduction varying from 2½ to 4 cm. at different levels; but so far as appearances go there has been no material change in the limb.

A blood-count gave the following results: Red blood-corpuscles, 5,090,000; white blood-corpuscles, 5000; hæmoglobin, 68 per cent. The blood flows readily from the ear and very freely from the great toe of the right foot. Rouleaux formation is abundant. The blood has been examined at four different times for the *filaria sanguinis hominis*, each time with negative results. Examinations were made at night, as well as by day; from the ear, the finger, and the right great toe; and I think it may be safely said that this is not a case of elephantiasis due to the filarial parasite. In all probability the disease is dependent upon an inflammatory obstruction of the lymphatic vessels, but it is difficult to find in the history anything of etiologic significance. It is possible that the pressure of the tongs played a part; it may, indeed, have been the exciting cause. He is the only one of the workmen in the foundry that is afflicted with elephantiasis, although others are employed in similar occupations. A severe lymphadenitis in the groin, which is sometimes the cause of elephantiasis, has not existed in the patient. The possibility that the attack of typhoid fever had something to do with the condition suggests itself, but the fact that the typhoid fever occurred thirteen or fourteen years before the elephantiasis began

renders that view unlikely. Recurrent attacks of cellulitis of erysipelatous type, which are frequently noted in cases of elephantiasis, have also been absent in this case.

In the way of treatment I have tried thyroid extract, the iodids, methylene blue, and other remedies, without benefit. The chief subjective complaint being headache with occasional abdominal pains and pains in the legs, I prescribed antipyrin in five-grain doses. Since that time he has been feeling very much better, and is practically free from pain. Three or four powders a week suffice to keep him very comfortable.

Some Cases of Pleural Exudate with the Physical Signs of Pneumonia.

BY HERMAN B. ALLYN, M.D.

[Read April 11, 1900.]

The physical signs of serofibrinous or purulent exudate in the pleura are usually so different from the physical signs of pneumonia that one is apt to feel, early in his practice, an unwarranted confidence in his ability to diagnose one condition from the other. Among the most important physical signs of an exudate in the pleura are diminished or absent vocal fremitus, diminished or absent vocal resonance, and faint or absent breath sounds, except posteriorly over the compressed lung. On the other hand, in pneumonia the most important and constant physical signs are increased vocal fremitus and resonance, and bronchial breathing. But just as there are cases of so-called massive pneumonia in which the vocal resonance and fremitus are not increased, and in which bronchial breathing is absent, so there are cases of pleural exudate in which vocal resonance and fremitus are present or increased and in which the breathing is bronchial or tubular. It is to the latter class that I wish to direct special attention. For the most part such cases are discovered at autopsy, but there are a few described in clinical reports.

In 1882 Austin Flint¹ reported the case of a man, aged thirty-one, who had a pleural effusion with the following physical signs: flatness on percussion over the whole of the right side. Over the scapula and in the infraclavicular region, the respiration was bronchial, and there was marked bronchophony. Over the remainder of this side there was

¹ The American Journal of the Medical Sciences, April, 1882.

absence of respiratory murmur, but vocal resonance and fremitus were somewhat greater than on the left side. The circumference of the right side was increased, and the apex of the heart was displaced an inch and a half to the left of the nipple. Puncture obtained serous liquid, and the patient rapidly convalesced. Flint says that the vocal resonance below the scapula and clavicle was not bronchophony conducted from the compressed lung. It had the characteristics of normal vocal resonance, and was accompanied by a proportionate amount of vocal fremitus. Comparing these signs on the two sides during the continuance of the effusion and after its removal, there was evidently some diminution caused by the liquid, but not enough to render the signs on the two sides equal. Flint does not explain the increase of vocal resonance and fremitus, but suggests that they may be due to the patient's voice which was notably strong and of low pitch.

Flint alludes also to a case of empyema in which the loud and whispered voice were conducted over the whole of the affected side of the chest with such intensity that there had been doubt as to the presence of liquid, although the patient had been previously aspirated. The aspiration was repeated and a large quantity of pus was withdrawn.

Vincent Y. Bowditch¹ reports four cases in which the typical signs of a pleuritic effusion, especially that of a diminished respiratory murmur, were supplanted by marked bronchial respiration. Synopses of his cases are as follows: Case I. A man, aged thirty-one, had pneumonia of the right lung with the usual signs of that disease. Bronchial breathing persisted after the fall of temperature and the apparent convalescence of the patient. Aspiration proved the presence of one and a half pints of clear serum in the area showing bronchial respiration. Case II. A man, aged twenty-one, had a typical attack of pneumonia. Harsh bronchial respiration persisted several days after a fall of temperature and a marked improvement of the general symptoms. Tentative aspiration over the site of bronchial breathing resulted in the withdrawal of twelve ounces of brownish serum. Immediate diminution of bronchial respiration followed. Case III. A male, aged fourteen, had pericarditis and endocarditis with pleuritic effusion in the left and lower portion of his back. This was proved by aspiration in spite of marked bronchial respiration in that region. In this case, the effusion was moderate and was suspected from the upward curve of dullness in the lower axillary region. The fluid was bloodstained. Case IV. A female, aged twenty, exhibited no definite physical signs for a week after entrance to hos-

¹ Boston Medical and Surgical Journal, April 22, 1897, p. 386.

pital. She developed in the right back a dulness which diminished upward, and was associated with crepitant râles, bronchial respiration, and slightly amphoric voice over the area of dulness. Tentative aspiration proved the presence of fluid. There was no special difference in fremitus, and no sign of fluid as distinguished from pneumonia, except a slight change of percussion note on change of posture.

Da Costa¹ says "there are, however, exceptional cases of pleuritic effusion, in which bronchial breathing is heard all over one side of the chest. Especially does this happen if a pneumonic condition accompany the effusion; but even in simple compression of the lung, and where the collection of liquid is not extensive, bronchial respiration may be perceived." He suggests that the lung tissue is probably compressed around the bronchial tubes.

Musser says the breath sounds may be heard, and are then weak and distant, or bronchial. Tubular breathing is said to be almost constant in children.

The explanation of the free transmission of fremitus, voice and breath sounds in pleural effusions is not satisfactory. Flint, as already mentioned, suggests that the quality of the voice, which was notably strong and of low pitch, had something to do with the increase of vocal resonance and fremitus in his first case.

West, after remarking that, sometimes, although the quantity of fluid be very great, loud bronchial breathing is heard all over the affected side, says that "the loudness depends not inversely upon the quantity of liquid effused, but directly upon the openness of the air tubes; for liquid is a good conductor of sound."

Osler says that in children there may be much effusion with retention of fremitus; and that in rare cases the vibrations may be communicated to the chest walls through localized pleural adhesions. Some authors have suggested that when the fluid is homogeneous the vibrations are transmitted much better.

I recently met with the following case of empyema with unusual physical signs: M. H., white, female, aged twenty-nine years, a native of Philadelphia, was admitted to the woman's medical ward of the Philadelphia Hospital, in the service of Dr. J. H. Musser, on December 2, 1899. Her chief complaint on admission was dyspnoea, pain in the left side, and prostration. The family history threw no light on her present ailment. The father had died when the patient was a child; the cause of death was unknown. The mother had died of worry over

¹ Medical Diagnosis, eighteenth edition, p. 408.

the death of a daughter. One brother, as the result of an injury to the superior maxilla; another brother, of some unknown cause. One brother is living and well. One sister died at the age of seventeen of some unknown cause. The patient's habits were good, she was single, was a domestic, and stated that she had always been in good health. She was plump and well nourished, and seemed to be above the average in intelligence. The patient's account of her illness was as follows: On the 11th of December, nine days before her admission to the hospital, she got her feet wet and took cold. Two days later she was taken ill, had fever and vomited, but there was no history of a distinct chill. She was in bed for a few days and then was able to be up for a day. Four days before admission she had a severe chill followed by pain in the left chest. These pains continued up to the time of her admission to hospital, and then subsided.

On examination it was noted that the pupils were equal and reacted readily to stimulus. The tongue was protruded easily; it was moist, coated on the dorsum, with edges and tip clean. Herpes labialis was quite marked. The pulse was quick and frequent, with diminished volume and low tension. The chest was well developed, symmetrical, and the expansion diminished. The superficial veins were prominent. The breathing was shallow and largely abdominal. Cough was slight. There was no history of bloody expectoration.

The left lung was flat on percussion from base to apex, anteriorly and posteriorly; the resistance was much increased. Fremitus was increased. The breathing was typically high-pitched and tubular. Posteriorly below the angle of the scapula and along the posterior axillary line were heard numerous moist subcrepitant râles. Bronchophony was marked, and pectoriloquy could be demonstrated. There were also areas over which superficial rubbing could be heard. The coin-test was not made. The right lung, just below the root posteriorly, showed areas over which moist râles were heard. The breath sounds over the lower lobe were bronchial.

The apex beat of the heart was slightly displaced to the left. The heart's action was accelerated, but there were no abnormal sounds. The abdominal viscera appeared normal. There was no œdema of the extremities.

On the 21st the heart was noted as regular, but rapid, the sounds being short and sharp. The second pulmonic sound was not accentuated. The entire left lung excepting a small area at the apex is flat on percussion. There was slight pain in the chest. The patient vomited after taking milk. On the 22d the heart was about the same, but respi-

ration was more labored. A few large bronchial râles which change on coughing were noted. Respiration was slightly harsh over the right lung, but there was no impairment of resonance on percussion. The patient expectorated tenacious sputum and perspired freely. On the 23d the patient was about the same. Cough was more annoying. On the 24th she was slightly weaker. Perspiration was less free. More moist râles were audible over the base of the left lung. Cough worse and expectoration freer. There was some cyanosis. During the night, while resting comfortably, the patient suddenly died.

The urine on the 21st contained numerous hyaline casts and albumin one-thirtieth by volume. There was no sugar. The specific gravity was 1030. The temperature on the night of admission was 102.5°. The next day it ranged from 100° to 101°, and then gradually fell to normal. On the afternoon of the 23d it again rose to 100°. The pulse ranged from 120 to 160, and generally from 132 to 140. The respirations ranged from 44 to 36.

To sum up, here was a young and apparently intelligent young woman who said that she had been perfectly well until nine days before admission, and that four days before admission she had been taken with a severe chill and since had been in bed with fever, cough, pain in the side, and expectoration. The physical signs on admission bore out her statement, and consisted of flatness on percussion over the left lung, increased vocal fremitus, bronchophony and pectoriloquy, tubular breathing, and some subcrepitant râles at left base.

At the autopsy there was found a thickened pleura, with about 250 c.c. of pus, a fibroid lung, with bronchiectasis and old tubercular foci in both lungs. There was probably just enough air space above the small layer of pus to act as a resonator for the voice and breath sounds transmitted through the dilated bronchus.

The question naturally arises, Is there any certain way in which a pleural exudate can be recognized? Evidently there is no pathognomonic sign. The only safe way is to examine for all the physical signs and not expect any one sign to have a fixed and definite value. The value of a particular sign must be determined with reference to the special case under study and in connection with all the other signs. Thus, flatness on percussion and greatly increased resistance indicate fluid in the pleural cavity rather than consolidation of the lung; but they are far more significant if the upper line of flatness follow the curves studied by Garland and Ellis; if there is change in the level of flatness on change of posture of the patient; if above the level of flatness anteriorly there is skodaic resonance; if there is displacement of

organs, and if there is restricted or absent movement of the diaphragm on that side.

In the same way diminished or absent vocal resonance and fremitus, and distant or absent breath sounds while very valuable and, indeed, almost constant signs of pleural effusion, cannot be relied upon exclusively; confirmatory signs must be sought for, and in all doubtful cases the question decided by puncture with a sterile needle.

West says: By percussing the chest in front with two coins and auscultating behind as for the bell sound, a pleural effusion will sometimes be found to transmit a clear metallic sound (penny sound, *signe de son*) quite unlike that heard through healthy or solid lung.

T. H. Kellock¹ says that if the left hand is used to palpate in front under the nipple while the corresponding ribs just posterior to their angles are percussed sharply with the finger or the pleximeter, much greater vibration will be felt when fluid is present.

The most important test of the presence of fluid in the pleural cavity is puncture with an aspirating needle. The large syringe and needle used for antitoxin injections are preferable, because if the fluid is thick it may not flow through the small needle of an ordinary hypodermic case, or the latter needle may not reach far enough. In spite of such precautions, however, fluid may be present and not be reached. In small, old empyemas the amount of pus may be small and not be reached unless the puncture be made lower than the sixth or seventh interspace, in which case there is danger of puncturing the diaphragm or liver. Or the needle may be thrust into a fibroid lung, and a dry tap result. Or the pus may lie between the lobes and be difficult to reach. Sometimes a number of punctures has to be made before the pus is struck.

On the other hand pus may be obtained from a subphrenic abscess, from the pericardium or from a dilated bronchus or lung cavity.

The X-rays are of great service in the diagnosis of pleural effusions, and of the amount of fluid present. Williams says that when the effusion is large no more rays pass through it than through the liver, and the outlines of the diaphragm, ribs and heart are obliterated on the side of the effusion. If there is a smaller amount of fluid, the outlines of some of the upper ribs are seen, and with a small effusion the outlines low down in the thorax only are ill defined. The fluoroscope detects displacement of organs which may not be discovered by percussion, and so helps to distinguish between pleural effusion and thickened pleura. The upper line of the shadow may be made to move by shaking the patient.

¹ Lancet, London, 1896, i., p. 845.

The Etiology and Pathology of Empyema.

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[Read April 11, 1900.]

I. Thoracic empyema or purulent pleurisy is an infectious inflammatory condition of the pleura, non-specific, characterized by a purulent accumulation in the pleural cavity.

Etiology. As the condition is infectious but not specific, a variety of causes may lead to it. Thus we may consider: 1, traumatic injuries of the chest wall; 2, local disease of the chest wall and lung; 3, lymph metastasis; 4, blood metastasis.

1. *Traumatic injuries.* In the greater number of cases, it is comparatively easy to explain the occurrence of empyema after traumatic injuries of the chest wall by the presence of an external or pulmonary wound through which the infectious agent shall enter. Such lesions are evident in punctured and gunshot wounds, compound fracture of the ribs, hypodermic and paracentesis wounds, etc., but in some few cases it is extremely difficult to see in just what manner the trauma acts. This is well illustrated in a case mentioned by J. G. Sutton (*Lectures on Pathology*, p. 235) who speaks of "having performed an autopsy upon the body of a young muscular man, who died rapidly from suppuration of the pleura after a blow on the side. There were no other lesions."

A traumatic non-specific purulent pleurisy may be experimentally produced by the introduction of irritating chemical substances—oil of turpentine, etc.—into the pleural cavity. In the traumatic empyemas the cause of infection seems to enter the chest from without, and examination of the pus in such cases usually reveals the presence of staphylococci and other familiar micro-organisms.

In speaking of chest-punctures as causes of empyema, some mention ought to be made of the exploration of the chest by the hypodermic needle, and the withdrawal of fluid through an aspirating needle as sources of infection. Griffiths (*British Medical Journal*, 1887, i., p. 831) in 1887 carefully studied 151 cases of aspiration and found that in two cases only did the fluid become purulent. One of these was complicated with tuberculosis, the other with erysipelas.

2. *Local disease* of the tissues contiguous to the pleura is a fruitful source of empyema. Broncho-pneumonia, especially the forms occurring in influenza and tuberculosis; croupous pneumonia, tuberculosis, car-

cinoma, gangrene, cavity formation and abscess of the lung may lead to empyema under appropriate conditions.

In tuberculosis which is the most fruitful source of the disease in adults, the tuberculosis itself may excite empyema, the condition having been observed in primary tuberculosis of the pleura as well as in tuberculosis of the lung, or the disease may lead to empyema by the escape of infectious material from small superficial cavities. If these cavities rupture pneumothorax usually results. In tuberculosis it is possible for empyema to depend upon extension of infection along the lymphatic channels from lung to pleura, but this seems to be quite unusual, for, in tuberculous empyema, the tubercle bacillus is commonly the only micro-organism present, and not infrequently careful search fails to discover any organisms in the pus. The tuberculous empyema commonly develops as a sero-fibrinous pleurisy which subsequently becomes purulent.

Carious ribs and vertebræ sometimes lead to empyema, though probably more frequently the reverse condition is true and the empyema leads to caries and necrosis of the bones.

Perforation of the diaphragm and the evacuation of a hepatic abscess into the pleural cavity has been known to excite empyema. Carcinoma of the œsophagus and even of the stomach may by perforation into the pleural cavity cause purulent inflammation.

The rupture of echinococcus cysts and the escape of their contents into the pleura may lead to pus formation.

Sometimes mediastinal abscesses and suppurating or tuberculous bronchial or mediastinal lymphatic nodes break down and evacuate into one or the other pleural cavity with resulting empyema. In rare cases gumma of the lung, liver, pleura, chest wall or other tissue may by rupture or otherwise act as exciting causes of purulent pleurisy.

As in the traumatic empyema, no one specific micro-organism covers all these cases, and in each particular condition micro-organisms easily accounted for by the primary condition are present.

3. *Lymphatic metastasis* is probably an important means by which bacteria reach the pleura from neighboring but not contiguous tissues. In some cases it may be that primary inflammatory diseases of the pericardium extend to the pleura by the lymphatics. It may be by the lymphatics that the pleura becomes infected in pneumonia. Sometimes the source of infection seems to be much more remote. Sutton mentions the occurrence of pleurisy in middle-ear disease by an extension of the inflammation to the cellular tissue of the pleura along the sheath of the jugular vein. Wounds of the neck and ligations of the great

vessels of the neck have been followed by pleurisy of similar occurrence. In rare cases peritonitis may extend to the pleura by lymphatic extension through the diaphragm.

4. *Blood metastasis* is typically illustrated by pyemia. The bacteria circulating in the blood may be deposited directly in the pleura with the production of small abscesses which open into the pleura and infect it, or there may be a previous hematogenic septic pneumonia with miliary abscesses and escape of bacteria into the pleura. In some of the infectious fevers empyema occurs either as a complication or a sequel. This is most common in scarlatina but also occurs in typhoid, measles, whooping-cough and pneumonia. The micro-organisms present may or may not be those specific for the respective diseases.

In diseases characterized by diminished resistance to infection, as nephritis, the micro-organisms which enter the blood and fail to meet with prompt destruction, may accidentally lodge in the pleura and excite empyema.

BACTERIOLOGY. The bacteria most frequently discovered in the pus of empyema are the streptococcus, pneumococcus, tubercle bacillus, staphylococci, typhoid bacillus, influenza bacillus, Friedländer's bacillus and the bacillus coli communis.

The micro-organisms found in the pus vary considerably with the time of life at which the empyema occurs. Thus, in children the pneumococcus is most frequently met, while in adults it is the streptococcus. In adults the number of tuberculous empyemas is nearly twice as great as in children. The following table from Netter who has done the best bacteriological work upon the subject will amply explain the differences :

	Children.	Adults.
Pneumococcus	53.6	17.3
Pneumococcus and streptococcus	3.6	2.5
Saprophytic organisms	10.7	
Staphylococci		1.2
Tuberculous cases	14.3	25.
Streptococci	17.6	53.

1. *Pneumococcus empyemas.* According to Netter these may be primary or secondary. He thinks the primary forms may depend upon the penetration of the air-cells of the lung so that the pneumonia may enter the pleural cavity without exciting pneumonia. It is not impossible that the infection is hematogenous.

Netter found the pneumococcus in 53 out of 156 cases studied ; Levy found it in 9 of 17 cases studied, and Prudden found it in 9 out of 24 cases. Netter found that out of 127 cases of empyema of adults 32

(about 25 per cent.) were caused by pneumococci, while of 29 cases in children 21 (or nearly 75 per cent.) were caused by it. It is, therefore, vastly more common as a cause of empyema in children than in adults.

Koplik found the pneumococcus in 60 per cent. of the cases he studied. Hold found pneumococci only in 14 out of 19 cases studied. In the remaining cases the streptococcus only in 3, pneumococci and streptococci in 1 and staphylococci only in 1.

Netter believes that the greater number of pneumococcus empyemas are of secondary origin though out of 53 cases he could only secure a history of pneumonia in 19.

The pus which characterizes the pneumococcus empyema is usually of the variety known to the older writers as laudable pus. It is thick, rich in corpuscles, and is apt to be viscid. Sometimes it has a peculiar greenish color though none of these peculiarities are constant and there may be nothing about the pus to suggest from what infection it springs.

2. *Streptococcus empyema* is the most frequent form met with in adults, comprising 56, or 44 per cent. of the cases in Netter's group of 127. In 24 cases studied by Prudden the streptococcus was present in 7—29 per cent. Ferdinand studied 12 cases and found the streptococcus in 6—50 per cent.

Summing up the subject Whitney (*Twentieth Century Practice of Medicine*, vol. vii., p. 39) finds that the streptococcus is present in about 40 per cent. of the purulent pleuritis of adults.

The streptococcus form of the disease is usually secondary to suppurative foci elsewhere in the body. The most frequent seat of these lesions Netter believes to be the lung. The pulmonary lesions may be unnoticed or may occur as broncho-pneumonia, croupous pneumonia, tuberculosis, bronchiectasis, abscess, gangrene and neoplasm.

Streptococcus empyema also occurs from suppurations in the mediastinum, peritonitis, subphrenic abscess, and in various others of the infectious diseases, especially scarlatina, erysipelas, diphtheria and measles. It may also succeed suppurative processes of the limbs.

This form of empyema is usually of acute occurrence and leads to rapid pus formation. The fluid of the exudate begins as a slightly clouded exudate which soon becomes opaque and purulent. Upon standing the fluid readily allows the contained pus corpuscles to sediment, and separates into two layers, one of clear fluid and one of thick yellowish purulent deposit.

3. *Tuberculous empyema* is by no means as frequent as was at one time supposed. Of Netter's 156 cases only 15—10 per cent.—were of this nature. Prudden found the tubercle bacillus in only 1 out of 24

cases, Koplik in 1 out of 12 cases in children; Ehrlich in 7 out of 19 cases. In the tuberculous empyemas, however, judgment cannot always be based upon the presence of the tubercle bacillus as in many cases so few of the organisms are present that their detection is attended with much difficulty.

Ziemssen, Levy and Ferdinand agree with Netter as to the infrequency of pure tuberculous empyema while Kelsch and Vaillard believe it common. Tuberculous empyema may in rare cases be acute and rapidly fatal, Osler having seen such cases. Usually it is chronic and often develops to an advanced stage before it is noticed. Usually the patients die of tuberculosis, but in some cases a fair degree of health returns after the evacuation is complete. The pus in this form of empyema is like that of cold abscesses and tuberculous lesions generally, *i. e.*, is thin, watery, curdy and deposits a powdery or flocculent sediment. It may be somewhat hemorrhagic.

4. *Staphylococcus empyema* usually depends upon the staphylococcus pyogenes aureus which enters the chest from without in most cases though it may be derived from other staphylococcus foci. The organism is not frequent. Netter met with it in 21 out of 156 cases, 6 times in pure, 15 times in mixed culture; Grawitz encountered it twice out of 48 cases; Prudden in 1 out of 24 cases; Koplik in 1 out of 12 cases.

Whitney says that the organism is always of secondary importance and its associate nearly always determines the character of the suppuration.

5. *Typhoid empyema*. The bacillus typhosus has been found in pleuritic pus by Valentini and by Lorigu and Pensuti in one case each and in two cases by Weinbraud and Spring. The bacillus is usually in pure culture though it has been found together with staphylococci.

6. *Colon bacillus empyema*. Observations are on record in which colon bacilli have been found in the pleural pus by Widai, Dumontpallier and Wendrix. I have been unable to secure the details of these cases.

7. *Friedländer's bacillus empyema*. The bacillus of Friedländer has been found in empyema in two cases one of which is reported by Letulle, the other by Netter.

8. *Gonococcus empyema* has been reported by Bordoni-Uffreduzzi and Mazza. The patient was a young girl, eleven years old, and suffered from blennorrhagia and blennorrhagic polyarthritis.

9. *Influenza empyema* probably commonly depends upon the streptococci and pneumococci but Pfeiffer has succeeded in isolating the influenza bacillus from the exudate of empyema in two cases which he investigated.

Bareggi has also done the same in a case of purulent pleuritis following broncho-pneumonia.

10. *Miscellaneous.* Occasional interesting observations upon the micro-organismal inhabitants of empyemic pus merit brief mention. Osler says that occasionally psorosperms have been found. Spirilla were unexpectedly encountered in one case and corresponded with the form frequently met in the mouth. It could not be cultivated. A case of leptothrix empyema in a dog is on record.

Diphtheria bacilli have been found in empyema occurring as a sequel of diphtheria though usually the streptococcus would be expected in these cases.

11. *Putrid empyema* is caused by the entrance into the pleural cavity of saprophytic bacteria. The condition usually occurs from cancerous processes of the gastro-intestinal apparatus which work their way into the mediastinum and gradually invade the pleura, or from gangrene of the lung.

The process is characterized by extreme fetor. The odor is sometimes like that of a privy, ammoniacal and disgusting; sometimes nauseating, sometimes like pickled alcoholic specimens, or sulphuretted hydrogen.

The bacteriological flora is very mixed, many species both aerobic and anaerobic being present. Of the cultivable forms Würz mentions the *vibrio septique*, the colon bacillus, micrococcus tetragenus, staphylococcus pyogenes, streptococcus pyogenes, and a proteus common in the intestine.

Of the non-cultivable forms the spirochæte denticola of the saliva and others are mentioned.

Würz points out that considerable practical prognostic importance attaches to the bacteriological study of the pus of empyema. Thus empyema in childhood, caused by the pneumococcus is quite benign and runs a rapid course to recovery while that caused by the streptococcus runs a slower course and is more serious. Tuberculous pleuritis is a chronic process usually terminating fatally or lasting for years until tuberculosis or an intercurrent affection carry off the patient or he gradually succumbs to prolonged hectic, amyloid disease and asthenia.

Empyema is more frequent in children than in adults. Mackey found that 40 per cent. of all the pleural effusions of childhood were purulent while only 5 per cent. of those of adults were so. The disease may occur at any age. Pleuritis has been found in the fœtus and in the new-born. The greatest number of cases occur between the twentieth and fiftieth years. Empyema is most common in childhood.

The affection is usually unilateral though both sides may be similarly affected. The left side is more frequently affected than the right.

II. MORBID ANATOMY. The pleural cavity in empyema contains pus. The quantity may vary from a few cubic centimetres to several litres and the quality will vary according to the mode of formation, the duration and prognosis of the affection.

In the cases which begin with a sero-fibrinous exudate and later develop into empyemas the formation of pus is indicated by a clouding of the liquid, depending upon the accumulating corpuscles. Later the great increase in the corpuscular elements gives the exudate the typically purulent appearance.

In these cases the amount of exudate is usually considerable before it becomes distinctly purulent.

The cases which begin with pus formation may be observed at any stage of accumulation and the quantity of pus may be very small.

In ordinary cases there is a distinct tendency for the pus to separate into layers by the sedimentation of the contained corpuscles. This leaves a fairly clear fluid with a thick crumbly or flocculent sediment below.

Errors in diagnosis may be occasioned by this sedimentation as unless care be exercised an exploring needle may withdraw clear fluid instead of pus.

The appearance of the pus varies with different conditions, and in the different infections. It has been shown that in the pneumococcus empyema of children the pus is apt to have a greenish color. In the ordinary streptococcus empyema of adults it presents the appearance of laudable pus, in the tuberculous cases it is somewhat variable though usually flocculent and curdy and lacking in healthy morphological constituents.

The pus has a specific gravity varying from 1023 to 1025. It is, of course, rich in albumin and contains glycogen, paralbumin, urea, uric acid, and cholestearin (Naunyn). Sometimes leucin, tyrosin and xanthin are present. In rare cases crystals similar to those of spermin are present and are thought by some to indicate that the empyema originates from ruptured hydatid cysts.

The pus usually has an acid reaction but if infected by saprophytic micro-organisms may become alkaline in reaction.

The progress of the disease is frequently associated with changes in the exudate. In individuals with good absorbing powers as in children it is possible for the entire exudate to be absorbed. In the greater number of cases, and especially in adults, however, the fluid is absorbed

leaving the corpuscular elements remaining to undergo degenerative changes. Fatty degeneration, the formation of fatty acids, leucin, tyrosin, cholestearin, etc., take place in the corpuscles and the inspissation of the solid part of the exudate by the absorption of the fluid, changes the contents of the pleural cavity into a cheesy or crumbly mass of grayish yellow color. In the course of time lime salts usually precipitate in this mass which then becomes dense and gritty.

Changes in the pleura. In pneumococcus empyema of children the pleura may show surprisingly little alteration, its surface being smooth and shining or slightly dulled and congested. Upon microscopical examination the subendothelial tissue of the pleura is found infiltrated with pus cells.

More commonly in empyema the pleura participates in the disease process and upon its congested and thickened surface flakes of fibrin and shreds of degenerating endothelial tissue are observed. As the empyema continues to increase in size and the pus to act upon and macerate the tissues the pleura may become more and more distinctly covered with a pseudomembranous formation of grayish-white color and loose attachment. When stripped off this sometimes leaves a shining surface which indicates that the endothelium is intact, but more frequently leaves a dull eroded surface which indicates that the endothelium is destroyed. The nature of the pseudomembranous formation is uncertain. It is thought by most pathologists to originate from the inflammatory exudate by coagulation upon the surface. By others it is looked upon as a product of the degenerating endothelium, by still others who find that the endothelium is sometimes elevated and covers the so-called fibrin formation, as a product of subendothelial connective tissue degeneration of the pleura.

In nearly all cases of empyema pleuritic adhesions are observed. Their formation usually begins at the apices of the diseased lungs, probably because of the quiescence of that part of the pulmonary tissue during respiration, and because the accumulating exudate separates the surfaces lower down.

The adhesions may be inconspicuous but quite frequently descend nearly to the fluid which becomes circumscribed so as to more closely resemble an abscess cavity than a purulent collection in the pleural cavity. The corroding action of the pus upon the pleura is quite evident and from prolonged contact it loses the endothelial covering, becomes greatly thickened, infiltrated with pus cells and forms a true "pyogenic membrane."

Lime salts are deposited in this thickened and altered pleura earlier

than in the inspissated pus of the cases terminating by absorption, and sometimes true bone formation—pleural bones—has been observed.

The pulmonary pleura is even more diseased than the costal pleura so that in the chronic cases the lung becomes covered with a thick rind which is soft and œdematous, necrotic and lacerable so long as there is fluid in the chest, but which transforms into an unyielding callous rind as soon as evacuation or absorption brings about regenerative changes.

Contact with the pus not only affects the pleura, but seems to affect the subjacent tissues as well. We find the tone of the diaphragmatic muscle is lost so that in empyema the diaphragm is more depressed than in other fluid accumulations in the chest. The intercostal muscles also indicate loss of tone by permitting the intercostal spaces to bulge.

The erosions sometimes progress so that the subpleural and deeper tissues are destroyed and the empyema like other abscesses "burrows" its way to the surface to evacuate. This form of empyema is described as an *empyema necessitatis*. Such an empyema usually "points" and if not surgically treated, spontaneously evacuates its contents. By the greater number of writers it is said that the "pointing" and evacuation usually take place as was first pointed out by Cruveilhier, in the space between the sternal end of the lower costal cartilage and the sternal border, the reason given for this being that the external intercostal muscle is absent and resistance diminished at that point. Eichhorst found that his experience with spontaneously evacuating empyemas did not coincide with this observation for in nearly all of his cases the perforation of the chest wall took place in the fifth and sixth intercostal spaces between the mammary and axillary lines. Osler says the perforation of the chest wall may occur anywhere from the third to the sixth interspace. According to Marshall it is usually in the fifth.

While usually distinctive enough, the burrowing and pointing of an empyema may be most perplexing, making its appearance in most unusual places. Eichhorst mentions a case in which the pus burrowed down behind the peritoneum and suggested a paranephritic abscess. Cases are not lacking in which it descended to Poupart's ligament and simulated psoas abscess. It has been known to reach the knee before pointing. Bouveret described a case that pointed in the lumbar region and simulated a lumbar aneurism.

When the abscess points the appearances are usually sufficiently characteristic, though they may be mistaken for aneurism especially in the cases which pulsate. The skin assumes a reddish or purplish tint and becomes œdematous and boggy over the projecting eminence that forms. The tumor fluctuates and not infrequently pulsates.

Rupture is usually sudden and a litre or more pus may escape with a gush. In some cases the opening is very small and the pus escapes in drops.

The evacuation may take place from a single opening or there may be several, which may communicate beneath the skin. In a few cases evacuation is followed by closure of the fistula and recovery. In the majority of cases the fistulous communication with the chest remains for years. Osler mentions a case, given in Copeland's *Dictionary of Medicine*, of a Bavarian physician who had a pleural fistula for thirteen years and enjoyed fairly good health.

As long as the fistula remains open it continues to discharge pus and the drain upon the system thus incurred ultimately may lead to constitutional involvements such as amyloid disease of which complication the patients may die if not carried off in advance by the tuberculosis occasioning the cold abscess or by intercurrent affections.

The erosions caused by empyema are not always exerted upon the external tissues, and their movement and evacuation are not always toward the outer surface of the body. Sometimes the lung is eroded and a fistulous communication with a bronchial tube set up. This is a dangerous accident for in the escape of pus from the tube more pus may enter than the patient can expectorate and he becomes overwhelmed, aspirates pus into the healthy part of the lung and drowns in it. When this is not the case, pneumothorax is nearly always sure to follow.

Sometimes the perforation is into the oesophagus or into the stomach and the pus is vomited or passed with the feces. The pericardium is sometimes perforated. The mediastinum is not infrequently involved, and an empyema of one side may find its way to the opposite side by fistulæ through the mediastinum.

The presence of pus in the pleural cavity gives rise to more or less well-marked constitutional symptoms such as loss of appetite, hectic fever, sweats, and there is always pain or greater or less intensity in the affected side. So soon as the pus is evacuated these symptoms subside. If, however, the fistula heals and pus reaccumulates the symptoms again make their appearance.

Changes in the lung. It is almost impossible for empyema to occur without incommoding the action of the lung and except in the benign pneumococcus empyema of childhood and possibly a few of the rapid streptococcus empyemas of adults, they cannot occur without leaving permanent changes in the lung. The chronic tuberculous empyema is particularly damaging to the pulmonary tissues.

The immediate effect of empyema is to occupy space so that complete

expansion of the lung becomes impossible. As the empyema becomes larger, the expansion becomes less and less until atelectasis is almost complete and in exaggerated cases the organ becomes inconspicuous in size, flattened in form and may later not only be atelectatic but also compressed by the increasing fluid. The tissue is solid, airless, tough, leathery, and grayish or reddish-brown or even blackish in color. When incised it is non-crepitant and carnified. The bronchial tubes may appear larger than normal and may contain muco-pus.

Few cases reach such a stage of compression and destruction as this, partly because few empyemas become large enough, and partly because of the early formation of adhesions between the pulmonary and costal pleuræ in the upper part of the chest. In the event of an increase of pus accumulation after the adhesions form a loculated empyema may result.

When the chest cavity is opened in cases of empyema the lung may not appear and the cavity of the empyema may seem to occupy the entire pleural cavity. This appearance depends upon the fact that adhesions have formed between the lung and less diseased parts of the pleura, while over the exposed pulmonary and costal surfaces the macerated, thickened and infiltrated pleura is completely changed into a "pyogenic membrane."

In still less marked cases when adhesions are not extensive and the process less chronic, the surface of the pleura becomes infiltrated and thickened and in the repair that follows recovery the thin edges of the lung suffer most.

In chronic empyema the macerating and corroding effect of the pus is exerted in large measure upon the pulmonary pleura which sometimes become so softened and infiltrated that the pus is permitted to enter the alveolar structure of the lung without actual perforation and be expectorated. That this process is one of infiltration and does not depend upon perforation is shown by the fact that in these cases pneumothorax does not occur.

The absorption of the pus and its entrance into the lymphatic structure of the lung is followed by inflammation of the interstitial tissue of the lung so that pleurogenic pneumonia is usually present in such lungs. If this process is active the dissecting effect of suppuration is very marked, if chronic, the fibrosis predominates and the trabeculæ of the lungs are thickened.

The recovery of empyema is followed by further disaster to the pulmonary tissue by the fibrosis that takes place. In mild cases of moderate duration the thickened pleura by its contraction rounds off the sharp inferior edges of the lung and offers some impediment to complete

expansion. In bad cases the expansion is greatly or completely hindered by the firm callous rind which forms upon the compressed lung and by its almost cartilaginous consistency prevents expansion.

In the very chronic, exaggerated cases, the atelectasis, carnification, fibrous and calcification all co-operate to make any improvement in the condition of the lung impossible.

When such cases recover or improve after evacuation, the space within the chest is not reoccupied by the lung but leads to a deformity of the thorax.

Empyema with atelectasis and compression of one lung is always accompanied by vicarious action of the other lung whose tissues are more or less inflated in consequence.

Changes in the thorax. The formation and continuance of empyema are accompanied by enlargement of the affected side. The diameter of that side is greater than that of its fellow and the intercostal spaces bulge. The diaphragm is pushed down and with it the liver on the right side or the spleen on the left. The heart is usually dislocated toward the opposite side and may embarrass the movements of the normal lung.

During the time that the pus is present in the chest the various adhesions, excavations, ulcerations and perforations already described progress and in addition there may be erosions of the cartilages and bones with caries and necrosis.

After evacuation and recovery the affected side of the chest usually collapses and the ribs sink in, the shoulder droops and the spinal column makes a scoliotic twist toward the empyemic side.

The hope of improvement by gymnastics will often be defeated by the further contraction of the new fibroid tissue in the chest, and all hope of causing the lung to expand in exaggerated chronic cases may as well be abandoned.

Effect upon the respiration. The empyema with the collapse of pulmonary tissue which it involves is an important hinderance to respiration, so that dyspnoea and insufficient aëration of the blood is usually a symptom. In addition to the compromised breathing space on the diseased side the dislocation of the heart toward the other side increases the difficulty and from the time the empyema forms it becomes a source of respiratory deficiency. The described subsequent changes make it impossible for this ever to be overcome and the patient will remain a more or less feeble breather.

Effect upon the circulation. The dislocation of the heart by pressure of the accumulating pus is noticeable in most cases and the pressure

and proximity effect is often palpable in the transmission of the cardiac impulse to the purulent accumulation and the occurrence of the so-called *pulsating empyema*.

The dislocation of the heart also makes traction upon and may kink the great vessels especially at the diaphragmatic orifices so that the circulation in the lower extremities is disturbed and may show itself in venous congestions.

General disturbance of the venous circulation is also occasioned by the obstruction of circulation in the diseased lung and increased labor of the right side of the heart. Right-sided cardiac hypertrophy is not infrequently observed in consequence of this increased labor.

The disturbed pulmonary circulation, as has been pointed out by Orth, is not infrequently associated with compensatory venous collateral circulations which form between the pulmonary vessels and those of the thoracic walls.

The Surgical Treatment of Empyema.

BY EDWARD MARTIN, M.D.

[Read April 11, 1900.]

Naturally the first question to be considered in discussing the surgical treatment of empyema is that of prophylaxis; and this, I believe, is best effected by the prompt aspiration or continuous drainage of inflammatory, non-purulent, pleural effusions as soon as their presence is positively determined. Though it is undoubtedly true that such effusions are often absorbed, many remain as an admirable culture medium for subsequent infection and the development of empyema; hence, since the removal of such effusions is readily accomplished and is comparatively free from danger, there seems no good reason for postponing mechanical intervention.

That aspiration should be done in a cleanly manner, scarcely need be stated. There are, however, one or two points concerning the technique of this minor operation which, because they are frequently neglected, are worthy of note. The site of aspiration should, under ordinary circumstances, be the eighth interspace, slightly anterior to the line of the angle of the scapula. A satisfactory degree of anæsthesia may be obtained by infiltration of 1 to 500 eucaine solution; or by freezing either with ice and salt or chlorid of ethyl. The aspirating needle should not be plunged through the skin, the latter should be opened by puncture

with a narrow-bladed knife; thus is avoided the danger of carrying infection from the skin to the pleural effusions. The needle should be carried across the upper border of the rib; the aspirations should not be too rapid; care should be taken when the effusion is large not to roll the patient too far over on his sound side.

When there is a recurring accumulation, after repeated aspiration, continuous drainage is indicated, as in the case of empyema. The skin having been incised, a trocar and canula, corresponding in size to a No. 16 French sound, may be employed to puncture the pleura. The trocar is then withdrawn, a drainage tube of such size as will fit the canula is passed through the latter, the canula is then withdrawn, leaving the drainage tube in place, and continuous syphon drainage is provided for, as in the case of empyema. Simple incision and drainage has also been efficient in these cases.

When the fluid contents of the pleural sac have become distinctly purulent, and this is now diagnosed by the physician with great accuracy, the indications for immediate operation become urgent. Under such circumstances a waiting policy affords no conceivable advantage. Though surgeons are unanimously in favor of at once opening and draining such infected pleural cavities, there is much diversity of opinion as to the position of the opening, the method of making it, and the best means of afterward draining the wound.

The point of election lies in the eighth intercostal space in a line with the posterior axillary fold. In circumscribed effusions, such for instance as these which are interlobular, the point of opening will vary in accordance with the position of the pus. The methods of making the opening and the subsequent provision for drainage, vary in accordance with the conditions present.

In comparatively recent cases, where the intercostal space is somewhat widened and the side bulged out, I believe that the best results are obtained by Bulau's continuous syphon drainage. This method, though condemned as inadequate, has in my experience been attended by most satisfactory results. The skin is incised and through the eighth intercostal space, at the seat of election, a trocar and canula, about the size of the little finger, is thrust upward and inward until it reaches the pus cavity, the cutting edge of the spear point being turned away from the under surface of the rib. The trocar is withdrawn and at once there is slipped through the canula a rubber tube, of the calibre of the trocar. This tube, which is three or four feet in length, is clamped below, and has marked upon it by slight nicks, points two and four inches from its extremity. The tube, having been thus introduced into

the thoracic cavity, the canula is slipped out and over it down to the clamp; the latter is then placed between the canula and the thorax, the canula is removed entirely from the tube, and the latter is attached to a glass tube which passes through the cork of a jar and beneath the surface of an antiseptic solution with which the jar is one-quarter filled. There is, of course, a second opening in the cork, through which is passed a short piece of glass tubing. By means of the nicks or marks placed on the thorax end of the rubber tube, the length of it lying in the chest can be determined. The end should lie just within the pus cavity. This having been adjusted and the tube having been fastened in place by a silk thread tied about it and secured to adhesive straps placed on the skin, the clamp which closes the drainage tube is loosened, the jar is placed two or three feet below the level of the chest, and the pus at once begins to drain away. When the accumulations are large, this draining is so rapid that the rubber tube must be clamped and the bottle emptied several times in the course of five to ten minutes. This method forces the lung to expand and take the place of the pus which is evacuated; since no air is allowed to enter the pleural cavity and the column of fluid two or three feet in height, exerts a constant suction action. As soon as possible the patient is encouraged to leave his bed; he then wears a small bottle strung about the waist, hanging as low as the knee or even down to the ankle. Sleeping and waking, every minute of the day, there is being exerted a force which tends to expand the lung.

The advantages of this method are, that it is simple, cleanly, can be accomplished without anaesthesia, though the forcing of the large trocar through the intercostal space is always painful, and that it produces a condition most favorable for complete expansion of the lung and thus an obliteration of the pus cavity in the most desirable way.

Its only disadvantage is incident to the fact that the tube sometimes becomes blocked by a fibrinous material, and that it is sometimes obstructed by a contraction of the chest and pressure of the ribs. Both these difficulties are readily obviated by the resection of about an inch of one rib; when either through a large canula or through an incision made with the knife a drainage tube, the size of the thumb, can be passed.

As a rule the old empyemata, complicated by curvature of the spine and deformity of the chest, owe their existence either to failure on the part of the physician to diagnose the condition, or on the part of the surgeon to provide early and prompt relief.

The operation for chronic empyema, with enormous thickening of the

pleura, consists in more or less extensive resection of the ribs, in accordance with the size of the cavity to be obliterated. Small cavities in young persons can usually be cured by moderate resection and packing with gauze. Large cavities, with hopelessly contracted lungs, by extensive resection, practically of the whole side of the chest. This resection includes the ribs, the periosteum, the muscles, and the greatly thickened parietal pleura; the cavity remaining, being covered as far as practicable by a huge flap of skin and subcutaneous fascia. Even in the obliteration of smaller cavities, resection of the ribs alone is often inadequate, the costal periosteum and the thickened pleura of the thorax wall, forming the outer boundaries of these cavities, requiring removal before ultimate healing can be hoped for.

In these old cases, all hope of obliterating the pus cavity, by causing expansion of the lung, is abandoned; the efforts of the surgeon being confined to removal of the bony chest walls, thus allowing the soft parts to sink in.

Even in these cases—or certainly in some of them—there is the hope of a partial restoration to a more normal condition, since Delorme has shown that a lung tied down by fibrinous deposit for months or even years, may still expand, if this imperfectly organized deposit is stripped off. His method consists in opening a trap door into the thoracic cavity, dissecting and tearing away the thickened fibrinous exudate covering the lung, inserting a drainage tube, and closing the opening without resection of bone. He reports a number of successful cases. This brilliant operation has not received the attention and trial, which the reputation of its originator and the brilliant results which followed it in his hands, seem to merit. It is gratifying to note, however, that a few surgeons have corroborated his observation. Thus:

Kiliani (*New Yorker Medicinische Monatsschrift*, No. 3, 1900) reports the case of a patient nine years old, who had suffered from total empyema of twenty months' duration following pneumonia. There had been first a puncture, next a thoracotomy, through which a large amount of pus had been evacuated. Some months after that the seventh, eighth and ninth ribs were resected, and about two litres of offensive pus were evacuated. The lung of that side was found completely compressed. The child rapidly gained in weight and strength, but there was left a large cavity, practically representing the entire right side of the thorax. Delorme's operation was performed. A flap was made, extending from the midaxillary to the mammillary line, and was lifted forward. The pseudo-membrane was partly peeled and partly torn from the lung beneath. This was extremely difficult, especially about the clefts dividing

the lobes from each other. The lung substance was, to a certain extent, torn, and there was some bleeding from the mouth and nose. As soon as the pseudo-membrane was removed, the lung began at once to expand, until finally when the operation was completed, it practically filled the chest, showing normal respiratory movement. The parietal flap was brought back into place, a drainage tube being inserted at the lower corner. The wound was completely closed in four weeks. Auscultation and percussion showed that the lung again completely filled the thorax; which on the diseased side was of a lessened capacity because of the previous rib resection and the decided scoliosis.

To summarize the treatment of empyema, the following propositions seem tenable: 1. Empyema is best prevented by promptly evacuating all considerable inflammatory effusions. 2. In the diagnosis of these effusions, by means of exploratory aspiration, the skin should be punctured by a tenotome at the point where the needle is to be driven in. 3. Serous effusions are best evacuated by aspiration. If they reaccumulate after the third evacuation, they should be subject to continuous syphon drainage; the puncture being made by a small trocar and canula, the latter being of such size that a small drainage tube may be slipped through it. 4. Recent empyemata are best treated by continuous syphon drainage; the tube being introduced through a canula of at least the diameter of the little finger. 5. When, because of a narrow intercostal space or because of constant blocking with fibrinous material, syphon drainage thus provided is inadequate, an inch of one of the ribs (usually seventh or eighth) should be resected and a drainage tube the diameter of the thumb should be used. 6. When the conditions are such that it is obviously impossible for the lung to expand under the influence of syphon drainage and respiratory exercises, Delorme's operation, of stripping the pseudo-membrane from the compressed lung, should be attempted. 7. When Delorme's operation is impracticable, a resection of the ribs (Estlander) or of the chest wall and thickened pleura (Schede) corresponding in extent to the size of the underlying cavity, is indicated.

DISCUSSION.

DR. S. S. COHEN said that the general subject had been so well treated that it would waste time to do more than to speak of some of the difficulties personally encountered in recognizing and treating cases of the kind under discussion. He had not always found it so easy as Dr. Martin had indicated to determine whether or not an effusion was purulent. Hectic rigors and the common signs of suppuration are sometimes wanting and it is only by

associating what might be called a number of intangible signs—for example the undue prolongation of the case, perhaps a suggestive hyper-leucocytosis, the depression of the patient, and an irregular temperature course, etc., that we are able to say that the effusion is purulent.

It is a simple matter in most cases to make the exploratory test, but sometimes even in the presence of pus the fluid obtained by the syringe may be non-purulent. In a case reported in the Philadelphia Polyclinic by his pupil, Dr. J. D. Love, of Yardley, Pa., three exploratory aspirations failed to obtain pus, but under ether, an incision emptied quite a large purulent collection.

When pus is present the physical signs are not very different from those of simple serous effusion. The displacement of organs is probably greater owing to the greater weight of the fluid, but, on the other hand, one cannot tell the exact quantity of fluid which has a certain weight, so that the greater displacement from the given quantity of fluid is not so significant practically as it seems to be theoretically. Baccelli's sign is not to be depended upon. Bronchophony is often to be found over purulent and non-purulent effusions. Above the effusion is a peculiar blowing breathing, usually high-pitched and in quality between amphoric and cavernous is almost pathognomonic of fluid—but is found both in serous effusions and empyema.

The greatest difficulty in diagnosis perhaps exists when the effusion whether purulent or serous is sacculated; puncture may be made in the wrong place and no fluid appear. That I have seen. Still, early exploratory aspiration even in the presence of a small quantity of fluid is the only proper method of diagnosis when pus is suspected. If the syringe fail, before attempting aspiration by canula Dr. Cohen would be inclined to ask a surgeon to be present and make the incision, and to be prepared to go ahead and do whatever was necessary in the event of pus being found.

He has had no experience with the method of syphonage described by Dr. Martin, but has used free drainage.

The most remarkable case of tuberculous empyema Dr. Cohen has seen, he has often wished to report, but has been waiting the conclusion of the case. He heard recently that the patient had gone to California, and hence its conclusion will not be under his observation. The case was that of a young woman whom he first saw in consultation with Dr. Spivak of this city five years ago. The diagnosis of pulmonary tuberculosis with cavity was made and an unfavorable prognosis was given. The young woman went into the country near Vineland, New Jersey, and for about a year she seemed to improve. She was then attacked with pleurisy. She came to Philadelphia with a large accumulation of purulent fluid and was taken to the Polyclinic Hospital. She was so weak that it was not thought advisable to give ether for an extended operation, so under cocaine an incision was made with the knife and the canula inserted and the drainage provided for. The patient did much better than was expected, and was discharged with the artificial fistula with the drainage tube inserted. Various methods of washing out the pleural cavity were used and various drugs employed with the idea per-

haps of stopping the suppuration. No tubercle bacilli were found, though examination was made several times. The pus gradually diminished in quantity, the pleural cavity contracted until finally an irregular tortuous fistula was left through which a small quantity of pus discharged daily. Estlander or other radical operation was deemed inadvisable. Later the patient began to cough a good deal and expectorated pus. From the physical signs, with the expectoration and the character of the discharge from the thoracic opening in which tubercle bacilli were found, it was concluded that communication had been made with the pulmonary cavity previously recognized. This condition went on for several years. The patient finally developed a tumor which protruded with every impulse of coughing in the second or third interspaces upon the same side as the fistula. The other lung showed some consolidation, but never any cavity. The tumor was incised and pus evacuated but the patient refused to enter the hospital again for more radical treatment. Later she was heard of at the Medico-Chirurgical Hospital, where her brother was a student. She was there operated upon by Dr. Rodman, who being present, might have something to say. The great interest in this case is the long duration after most unfavorable prognosis.

One sometimes sees remarkable recoveries after the evacuation of tuberculous empyema in children. An Italian boy seen in consultation with Dr. Bernardy seemed to recover thoroughly after simple incision and drainage and to have complete expansion of the lung some few years later.

The best prognosis may be given in those cases of empyema which follow pneumonia and in which the pneumococcus is perhaps the infecting agent. The most important to recognize are those cases which follow simple pleurisy, the purulent change occurring without known cause; and those which are purulent from the beginning.

Medical treatment is of course *nil*, except that the patient is to be strengthened by appropriate food, hygiene and tonic medication. Any treatment looking toward absorption is very bad, because it delays the necessary surgical intervention. After evacuation, inhalation of compressed air with expiration into rarefied air is useful to promote expansion. The movements of the sound side are to be restricted during inhalation.

DR. LEON BRINKMAN said Dr. Allyn spoke of the possibility of having a dry tap and of using a large needle for the exploratory examination or test. Dr. Brinkman believed that can be avoided. Before inserting the needle he fills the barrel of a syringe with salt solution, evacuates about half the contents and introduces the needle into the chest. He was glad to hear Dr. Martin advocate early evacuation of pleural effusion, and believed it is often possible to secure a cure of pleural effusion by simple evacuation of the contents of the chest. It has been the habit of some surgeons to irrigate the pus cavity to hasten repair. This Dr. Brinkman has found often to increase rather than decrease the amount of purulent material. He saw the advantage of the operation of which Dr. Martin spoke—the breaking down of the pseudomembrane, that it would be of the same value as the breaking down of adhesions in the abdomen.

DR. WILLIAM E. HUGHES said that Dr. Allyn called attention in his paper to the fact that a tubercular effusion may have tubular breathing as in pneumonia. Dr. Hughes went farther and said that it is very likely to have tubular breathing. To him it is a diagnostic sign. It is exceedingly exceptional in his experience to find tubercular effusion of any form that at some time or other does not present tubular breathing strikingly similar to that in pneumonia. This point is not recognized prominently by American writers and teachers as it is by the English. The breathing seems to be a little different from that of pneumonia and oftentimes by recognizing this difference the diagnosis can be arrived at. As to the diagnostic signs between pleural effusion and pneumonia, displacement of organs cannot occur in pneumonia, and when it does exist the condition can be depended upon for diagnostic purposes. Especially in children are the two signs very similar; as a rule, identical.

As to the diagnosis between empyema and simple pleural effusion by physical signs, that is practically impossible. He believed in almost every case this is true and that diagnosis can only be made by the recognition of a whole host of intangible symptoms, as said by Dr. Cohen. So that, sometimes diagnosis can be made by a consideration of the breath sounds and the voice sounds; these being not so pronounced in empyema, possibly, as in simple serous effusion, but the difference is so trifling that it cannot be absolutely depended upon. After all, the only safe way is to explore, and here he used, as advocated by others, the hypodermatic syringe. The dry tap will not unusually occur because the end of the needle does not get into the cavity. He heartily endorsed Dr. Martin's advice that all inflammatory purulent effusions be drained very early. It is Dr. Hughes' custom to drain as soon as the condition is diagnosed and the results are better. It is also his practice to drain the pleural cavity as thoroughly as possible at the first aspiration, to keep on pumping out fluid as long as the patient will bear it comfortably. He knew that the objection is urged that œdema of the lung may be produced from this. He has had this accident but once and the case eventually recovered. He believed that he could conscientiously teach that it is better in the long run to as thoroughly as possible empty the pleural cavity.

DR. A. B. HIRSH said he was glad to hear the stress laid upon one point by Dr. Martin—the thorough stripping up of the exudate in those cases in which resection of the ribs has failed to bring about normal conditions. The idea of removing all exudate and all adhesions seems to be so practical that it calls for commendation on the part of as many men as meet such cases.

DR. MORDECAI PRICE called attention to the removal of the sacculated condition of pus. In two cases tapped and drained for chronic pleurisy resection of the rib was made and an additional flow of pus was found. In order to accomplish the complete drainage of the pleural cavity he took a long sponge handle, put a little bunch of gauze on it and introduced and passed it around the lung in every direction, on the chest side and on the diaphragmatic side and so secured an amount of pus. He would be slow to

allow a second tapping in a case of pleurisy, but would insist upon the removal of the rib and complete exploration of the pleural cavity with a gauze sponge or any sponge on an instrument that could bring the parts within reach, and on thorough irrigation with boric acid. With such treatment he has yet to see any case that did not recover. He was glad to hear Dr. Martin advocate breaking away old inflammatory covering of the lung. He has never yet seen a case sufficiently bad to do that, but he saw no reason why it should not be done under proper conditions. In the surgical consideration, as stated by the men writing on this subject, if the lung does not expand there is but one alternative—let the ribs be so removed that the chest wall can cave in on to the lung to obliterate the cavity. There is no other way to save it.

DR. LEEDOM SHARP said that in a case in which the lungs were retracted he suggested to the patient that he take a bottle and blow on it as hard as he could. This was practised systematically and the result is that the lung has almost filled the whole cavity.

DR. WM. L. RODMAN said that inasmuch as Dr. Cohen had asked about the case referred to by him he, Dr. Rodman, would say that she came into the Medico-Chirurgical Hospital in a bad general condition. She would however only consent to temporary relief. She soon went to California. Up to the time of leaving the hospital she did very well considering the gravity of the case.

Much interest was expressed by Dr. Rodman in the papers of Drs. McFarland and Martin; the first one he did not hear. There is too great a tendency to regard all cases of pleurisy and especially purulent pleurisy as tuberculous in character. The results obtained are too good to believe that all are tubercular. Dr. Rodman agreed that empyema following pneumonia is the most satisfactory to treat. It is not enough to say, however, that the condition can be cured by one aspiration. Empyema in children is more benign than in adults, but he could not recall a single case of empyema in early childhood that was cured promptly by a single aspiration. Aspiration he regards as largely a diagnostic agent, and with little value as far as treatment is concerned. He agreed with Dr. Martin that drainage should be promptly instituted. The syphonage method spoken of by Dr. Martin appeared to Dr. Rodman as rational, but he had not practised it. The principal advantage in all operations for empyema is that the lung is forced to expand and prevent permanent and damaging adhesions. If an opening is made into the chest, air passes into the cavity and prevents collapse, which might occur from too rapid expansion of the lung or too sudden return of the heart to its normal position—sometimes the case in simple tapping. He insisted that the operation advised by Dr. Martin is not so easy an operation as some of the others, and he saw some objections to it; in the first place, it seems very easy to pass a canula through the intercostal space into the pleural cavity, but will it not often occur that the tube will be removed as the canula is withdrawn unless a large instrument is used, or in other cases excision of a rib may be necessary? Excision is not dangerous, but in benign empyema

it is unnecessarily severe. A patient walking about with the bottle arrangement would find it at times very inconvenient, but he thoroughly approved of the idea and meant to practice it in a favorable case.

DR. H. R. WHARTON agreed with the readers of the papers as to the importance of early operation, and said it is unquestionably evident that some form of drainage should be instituted immediately. In children he thought excision of ribs should be the exception. The elasticity of the ribs in the young will permit of the introduction of a good-sized drainage tube and allow the lung to expand better than in adults, so that he is decidedly opposed to any indiscriminate excision of the ribs in these cases. His ordinary plan is to pass a good-sized drainage tube through the opening bringing it out as near as possible to the base of the chest to secure it with pins and pass a free drainage tube at the lower opening. He covered all the openings of the tube with protective so that little air enters the chest through the wounds in expiration. He usually reserved this operation (excision of a portion of one or more ribs) for chronic cases where the fistula has existed for a long time with imperfect drainage and imperfect lung expansion. If adhesions are present they can be broken down and the lung given a chance to expand. At one time he thought the majority of these cases were tuberculous, but experience has taught him to change his mind in this respect. He thinks the operation is usually followed by good results. He has, however, even in children occasionally seen cases of death following empyema treated by thorough drainage. Considering the severity of the affection, however, the result is usually satisfactory.

Consanguineous Marriages.

BY JOSEPH HEAD, M.D.

[Read April 25, 1900.]

Consanguineous marriages comprise a topic so large and important that I should never have thought of treating it before this learned body if I had not been requested to do so by Dr. Musser. I am not able to speak as one with authority, but merely as the mouthpiece of great men, who during the last fifty years have written exhaustively upon the subject, and while I do not pretend to have covered the field of their researches I think that the extent of my investigations will be sufficient to give a fair estimate of their opinions.

The subject of consanguineous marriages may be viewed from three standpoints: the statistical, the analogical, and the historical. In weighing the numerous conflicting statistics that have confronted me in my reading on this subject, the old statement that figures cannot lie,

has arisen frequently as a paradox to my mind and I have seen that without any desire to pervert truth, a man can generally find in figures just what his bias of mind leads him to look for.

Devay, the French writer, deduces from his statistics that 18 per cent. of consanguineous marriages are sterile, while Dr. Bemis in discovering a large percentage of deaf mutes and idiots unconsciously proves that sterility is not one of the dangers to be feared.

Dr. Hows tells us that out of seventeen cousin marriages that he observed there were ninety-five children, of whom thirty-seven were in moderate health, one a dwarf, one deaf, twelve scrofulous or puny, and forty-four idiots. Now, unless this be an exceptional result, one would find it difficult to believe that cousins should ever have dared to marry, or that a man now venturing to marry his cousin should be allowed to go at large. And were these statistics a fair average, such overwhelming proof would have been revealed in prehistoric times.

Dr. Felix Robinson, of Nashville, 1860, has reported a cousin marriage that resulted in twelve children ; one was still born, two deficient in hands, and the rest healthy. This gentleman seems to have found the danger to be, not sterility, idiocy, or deaf mutism, but a tendency toward malformation.

Daniel Hooper, B.A., London, reports December 7, 1883, in the *Lancet* the following case of a cousin intermarriage, in relation to a family whose genealogy he knew. The father was sixty-two years of age, and the mother sixty. Their mothers were sisters in a family of which all the brothers had gout, and one sister consumption. The mother's father had died at an advanced age of sarcoma, and one of his brothers of cancer. The father's father died at the age of forty-three of what was called consumption. Dr. Hooper goes further into the family history, and speaks of hydrocephalus, tuberculosis, tabes mesenterica, suppuration of the cervical glands, etc., in such a way as to make it quite evident that any diseased tendency of the children might be explained on the grounds of heredity, and yet he reports the result of the marriage as follows, just as though the evil results were due to consanguinity of parents: " Excepting two or three of the oldest, all of them developed very slowly. I am now attending one of the sons who is twenty-one, who does not look older than fifteen. They made very little progress in their studies. Three of the sons are thieves and liars, one has a theroid aspect, large divergent ears and elephantiasis of the legs. He drinks to excess, and steals, as it were, of necessity, so that his parents, brothers and sisters are afraid to leave anything in his way. Another son, after breaking open his brother's cash box and stealing

£70 and the family silver, ran away to the diamond mines at the Cape." He then goes on to speak of nephritis and other ailments in such a way as to create great consternation in the mind of the reader, and as so much lying and stealing is deduced as the result of cousin marriages it becomes to him a question, as to whether such marriages may not be much more common than is generally supposed.

Dr. Arthur Mitchell, *Edinburgh Review*, 1865, came to the following conclusions: First. Consanguinity of parentage tends to injure offspring in various ways; it enfeebles constitution, increases the danger of disease, and causes depreciation and impairment of senses, especially of the hearing and of the sight. There are also apt to be errors or disturbances of the nervous system, as epilepsy, chorea, paralysis, imbecility, idiocy, and moral and intellectual insanity. Second. When children seem to have escaped injury, they may pass it on to their grandchildren. Third. Many isolated instances occur where no injurious effects can be traced. Fourth. That, as regards mental diseases from unions between blood relations, it is seen in imbecility, more than in the acquired forms of insanity, or those that present themselves after childhood. Fifth. That the amount of idiocy in Scotland is to some extent increased by the prevalence of cousin intermarriage.

These deductions are absolutely contradicted by George H. Darwin, the son of Charles Darwin, who going over the same ground sums up his statistics by declaring that in his opinion, consanguineous marriages, *per se*, are harmless, so long as the contracting men and women are healthy, but that the doubling up of similar disease tendencies is always to be avoided. Thus the fair-minded man must conclude that human statistics in their present condition are of little value, since any defect which may appear in a child born of consanguineous parents is at once attributed to the consanguineous marriage, when it may probably arise from some taint of which the parents are ignorant, or of which they are too much ashamed to reveal even to their physician.

To view consanguineous marriages from their analogy to the inbreeding of animals is unsatisfactory, because of the following conditions: First. The risk of unfavorable results with human beings is much greater than with lower animals on account of the power that breeders have in selecting healthy stock. Second. In the case of animals that are inbred it is possible to govern circumstances more than with men. For birth, parentage, and constitution being known, all cachexia can be avoided, and the defects of one parent can be counteracted by the strong points of the other. Third. The degree of inbreeding practised in the case of animals is much closer than in human beings. Bearing

these facts well in mind, let us now consider the interesting case quoted by Charles Darwin, in his work on *Plants and Animals Under Domestication*. He tells of a certain well-known breeder, Mr. J. Wright, who crossed the same boar with its own daughter, granddaughter and great granddaughter, etc., through seven generations. The result was that in many instances the offspring failed to breed, and others, that produced had children, many of whom were so idiotic that they did not have sense to suck and could not walk straight. It deserves special mention, he claims, that the two last sows produced by this long line of inbreeding had several healthy litters of pigs. The best sow in external appearance produced during seven generations, was one in the last stage of descent. She, however, would not breed with her sire, but bred at the first trial to a stranger in blood. In the case reported by Mr. Wright extremely close breeding did not seem to injure the external form or merit of the young, but in many of them the general constitution and the mental powers only were affected.

The case offered by Mr. Darwin is of great interest, even in spite of the three objections just noted. Yet if such close breeding is so extremely harmful, why is it that wild boars, lions and bison, drive off all other males from their immediate family, so that many of the children are of necessity born of incestuous unions. Also might not the old boar, in the seventh generation mentioned, have lost his vitality. But far be it from me to attempt to explain these statistics, and I shall instead quote Dr. Gilbert W. Childs, who instances the parentage of Comet, the most celebrated of the earlier bred, short-horned bulls, and the progenitor of an excellent stock. Comet was bred in the fifth generation from the crossing of fathers with daughters, and sons with mothers. He also mentions the famous bull Sir Samuel, who was the offspring of a son with his mother. Thus again we have directly conflicting statistics.

Dr. Hildebrand, on the analogy of plant life, mentions the *Corydalis Cava*, with hermaphrodite flowers, there being none of the usual mechanical arrangements to prevent self fertilization, the anthers being in close contact with the stigma, and yet the pistil is absolutely uninfluenced by the pollen from the anthers in the same plant. Further experiments yielded the interesting and significant result that when the pollen from two flowers on the same stock was mingled, seed was produced, but with small return, and it was only when pollen was taken from another plant that a full yield of seed was obtained. Hildebrand, in summing up his experiments on this subject, says: "There is no plant provided with sexual organs that can propagate itself continuously

by self-fertilization alone. In all cases cross fertilization is possible, and in the majority of cases, self fertilization is avoided by special arrangement."

Charles Darwin, also, apropos of plant fertilization, says: "When we consider the various facts, which plainly show that good follows from crossing, and less plainly that evil follows from close inbreeding, and that when we bear in mind that throughout the whole organic world, elaborate provision has been made for the occasional union of distinct individuals, the great law of nature is, if not proved, rendered in the highest degree probable, that the crossing of animals and plants which are not closely related to each other is beneficial or even necessary, and that interbreeding prolonged through many generations is highly injurious." No one can read Mr. Darwin's deduction and not be impressed with its force, and yet, does not the queen bee of a hive, propagate of necessity largely by incestuous unions?

In discussing the question from the historical point of view, matter of great interest can be quoted. The Persians married sons to mothers, daughters to fathers, brothers to sisters, that royal blood might not be contaminated with that of slaves. The marriage of half-sisters among the Greeks at the time of Pericles, Socrates and Plato, was very common; the practice of marrying cousins was so strongly rooted that the nearest cousin of an heiress had to be bought off, before she could be married to anyone else, and yet it would be a very brave man who should declare that the Athenians, who fought the battle of Marathon, who performed such prodigies in art, literature and philosophy, should be classed as degenerates. Cousin intermarriage among the Jews is quite common, not to mention the fact that Jacob was the child of cousins.

But, leaving the field of ancient history, which according to Dr. Huth seems not to have discountenanced cousin marriage, let us quote some modern instances indicating that incestuous marriages need not result in the degeneration of the children. The famous ship *Bounty*, sent out by England in 1789 is a case in point. Goaded by the cruelty of the captain, the sailors mutinied and landed on Pitcairn's Island. There, as a result of jealousy, internal strife, and association with native women, in the year 1800, one man, five native women, and nineteen children alone survived. In 1808 Mr. Folger found the total to be thirty-five. In 1825 Captain Beechley found thirty-six males, and thirty females, or a total of sixty-six persons. In 1830 Captain Waldegrave makes the total seventy-nine, showing an increase of thirteen in five years. Only three persons had joined the community, nor had

these joined long before. As to their health, all observers agree that nothing could be better. They were strong, averaging six feet in height, both sexes well formed and handsome, and their children uniformly enjoyed good health, while the women were almost as muscular as the males. Captain Waldegrave saw but one defective person, a little one-eyed boy.

There is a community established east of the Surabaya, Java, on the Tengger Hills, near the so-called sandy sea, consisting of 1200 persons distributed in about forty villages, who still profess the ancient Hindoo religion. They live in a state of Arcadian purity. The chief of every village is elected, and four priests, intelligent though uncultivated men, have charge of the sacred writings. There is no penal code, for there is hardly any occasion for it. A reproof from the village priest meets every case. They live frugally, are peaceful and happy, are proud of their institutions and themselves, and therefore take care never to marry out of their community; nevertheless they are larger and stronger than any other race in Java. While Dr. Huth gives us many more instances of equal interest, in view of the limited time, these quoted will be sufficient.

In summing up the three points with which we began it might be said, that human statistics, through hidden cachexias, are misleading, that taken as a whole, the analogy between stock breeding and human kin marriage is unsatisfactory, and that the analogy between human and plant fertilization seems to strongly tend to the conclusion that cross fertilization is essential, and yet it is questionable whether flowers that are cousins do not fertilize each other quite as perfectly as though the relationship were more distant; and as we are discussing in this paper only the propriety of cousin marriage, the plant analogy seems to have little force.

Historically, there is much evidence to show that communities have not suffered where close intermarriage of kin prevailed, and such positive proof is especially valuable, since, bad results might arise from disease, known or unknown, but good results would never be possible if consanguineous marriages were, *per se*, injurious. What is true of communities is true of individuals. The fact that numerous cases occur where consanguineous marriage results in healthy offspring speaks far more eloquently for the fact that cousin marriage, *per se*, is not harmful, than any number of evil results that may and probably do owe their origins to some hidden disease. To put it plainly, is there sufficient new blood in the child of first cousins to insure the proper amount of cross fertilization and consequent health? George H. Darwin who

was, no doubt, thoroughly acquainted with his father's views, thinks that there is ; Alfred Huth after broad and scientific research thinks that there is, as do numerous other competent authorities. Early asceticisms and church doctrine founded on the idea of pecuniary gain, may have strengthened the popular prejudice against cousin marriage. But all facts seem to warrant the deductions of Gilbert W. Childs, physician to Radcliffe Infirmary, Oxford, and consulting physician to Warrenton Lunatic Asylum, who says : " First. Marriage of blood relations, *per se*, have no tendency to produce degeneration. Second. They have a tendency to strengthen and develop in the offspring individual peculiarities of parents, both mental and physical, whether morbid or otherwise, and therefore in practice they often do produce degeneration. Third. There are some cases in which it would be actually safer, as far as chance of healthy offspring is concerned, for a man to marry a blood relation, than a woman not so related, with whose family history he is not acquainted. Fourth. That by means of a proper regard to known facts, relating to hereditary transmission, a physician may predict with accuracy the probable results, as regards the health of the offspring, of a marriage of blood relatives in any particular case, if only he be sufficiently acquainted with the hygienic and constitutional history of the family."

In summing up these facts we are warned not only against the possible dangers of consanguineous marriages, but against the perils of careless marriage, under any conditions, where cachexias and disease tendencies are heaped up, and accentuated to the possible ruin of the offspring.

**Some Facts Concerning Medical Education Elicited by the
Application of the Law Governing Practice in
the State of Pennsylvania.**

BY HENRY BEATES, JR., M.D.

[Read April 25, 1900.]

The subject engaging attention this evening, possesses unusual interest, because of its dual nature, vital import and multiplex relationships which are directly and indirectly associated with the educational systems operative in developing man to his highest capacity. The included main factors, which determine a final result, are two : medical education and medical legislation, and while each has one end for its

ultimate object, their respective functions are based upon governing principles of diverse character if, indeed, not, because of the conditions obtaining, positively antagonistic.

The vital importance attaching is paramount for the reason that, in every sphere of life, man's highest possible achievements are directly dependent upon physical and mental health, and also because that, for the maintenance of these latter, reliance *must* be placed upon the able and skilled adaptation and application of the principles and art of medical science.

The clinician, therefore, competent to faithfully discharge these obligations in accordance with conscientious principles must be, it seems superfluous to state, possessed of a high degree of both general and medical culture, and it is this essential determinate or ultimate property of the medical scholar, which establishes him in intimate relationship with the two especial and interdependent systems of education: the first, and necessarily so, general, and the second and naturally subsequent, special or medical.

How the two may be properly and advantageously correlated, the discussion this evening will probably indicate, but, before the matter can receive intelligent consideration, it will be necessary to briefly review the determining conditions which inevitably, from their intrinsic character, culminated in the abnormal situation with which our subject finds us confronted, a system of special education being related to legal regulation. If medical education had been, in the recent past, what the phrase implies, there would *not* have been medical legislation; therefore, when discussing the correlation of general education with medical, it behooves us as physicians to know thoroughly and well, what there was, connected with medical culture, that required through process of law, a proper adjustment of the means to the end. In the medical college, conventionalism rightly reposed the high trust and responsible function of conferring the doctorate. The public as represented in its various social relations of citizen, merchant, financier, lawyer, legislator or what not, entertained implicit confidence in this institution, and thus did it receive active support and was rendered secure in its established entirety, whenever question arose as to its integrity and faithful observance of duty. Its curriculum, *because of the trust reposed*, prevailed unquestioned, and was considered adequate to the occasion; and it is not doubted that many are they who, not having acquainted themselves with the minutiae involved, still entertain the belief that what was admittedly understood to be a sufficient and complete institution fulfilling its requirements, had *actual* existence.

The medical college then, if true to its principles, and faithful and conscientious in the discharge of the responsible duties of its high trust, should find its departments adequately equipped, and occupied with teachers and students possessing without exception, education, and in employing this term it is intended to express that which is exponent of the result of what Stein defines as "a method based on the nature of mind, every power of the soul to be unfolded, every crude principle of life stirred up and nourished, all one-sided culture avoided and the impulses on which the *strength* and *worth* of men rest, carefully attended to," in other words, ABILITY.

Such a degree of culture should be a condition for entrance and demanded by every medical college or school in existence, and no student of medicine should be permitted to engage in the responsible career unless first proven, beyond all doubt, to be so qualified.

Medical education! What was it? In the very recent past, the medical curriculum of the United States consisted of didactic instruction in the seven following named branches: Human anatomy, human physiology, chemistry, materia medica and therapeutics, practice of medicine, obstetrics and surgery. The student was obliged to matriculate and attend two courses of lectures, delivered in separate years, upon the enumerated subjects. Matriculation was conditioned *not* upon an adequate educational and moral standard, but by the payment of a fee of five dollars, and was alike practicable for the illiterate and the scholar. Graduation was conditioned upon the possession of two sets of professors' tickets (seven for each year) and passing what purported to be examinations. The two years were falsely called years, because instead of twelve months of medical college work, the time devoted, included the short space beginning with October 1st, and terminating about the first of the third week of the following February. Examinations then began, and about the middle of March the ceremonies connected with the public conferring of the degree, took place with all the dignity and impressiveness befitting the observance of a truly important and completed function. Subtraction, on account of holidays, from the time devoted to college work, reduced the actual period of study to little more than *four months*, and when it is recognized that, with the single exception of practice of medicine, the entire subjects were "gone over" by this process during each so-called year, it is evident that the second was but a mere repetition of the first. It is not difficult therefore to comprehend why students commonly neglected the first year's duties and relied upon making the "exams," by memorizing a not very creditable publication known as a "Conspectus." It was *not*

essential that the two courses of lectures be attended consecutively, and, worse than all, there was no system generally prevalent which enabled either the trustees or faculty to know whether the candidate had actually done the work *presumably* required, or simply possessed the two sets of tickets. To what the examinations amounted can best be understood when it is stated that the writer personally knew of students attending the several colleges, who did not introduce a knife into the cadaver, attended less than half the lectures, and, in one instance, pursued the second course of study fifteen years after the first! and, notwithstanding he had been engaged in a different vocation during the interim, like the others, received the degree with those who had conscientiously striven to achieve the best results which the disgracefully inadequate curriculum rendered possible, and their desultory study of the branches enabled. Study was unavoidably desultory for the reason that each professor delivered lectures without any regard for the relationship which his topic bore to those of the other branches, and it was not uncommon for the beginner to listen to a superficial discourse in anatomy, which had no bearing whatever upon the following lecture treating of some phase of physiology, and of the latter upon a theme in no sense enabling a comprehension to be had of an obstetrical, surgical or medical topic, concerning which, lectures, later in the day, happened to treat. Indeed the roster not infrequently arranged for lectures in the practical branches to be delivered before those treating of the fundamentals.

The system was as confusing as inadequate. As for practical instruction, what was thus designated was limited to voluntary attendance (not compulsory) upon "the clinic." This consisted of from one to two hundred or more students occupying seats so distant from the patient and lecturer who described what he cognized, as to afford opportunity of only hearing or seeing, as the instance determined, what the instructor proclaimed that he himself saw, heard and felt, if diagnosis were the topic, or did, if an operation were performed. It served a purpose parallel in value with what would be if a student of music only saw and heard what his instructor accomplished in performing upon a given instrument, and described to his listener how it was achieved; the victim himself never personally doing that for which he was supposed to be ultimately qualified, and accorded the right to practice.

Those conditions obtaining, which enabled anybody qualified or not, to engage in the pursuit of medicine and the great numbers who obtained the degree, coupled with the trust imposed by an unsuspecting public, as well as the honor ceded the doctor, naturally attracted to the inviting career of medicine, vast crowds of aspirants. The profitable

venture, the medical college, multiplied apace, and emolument proportioned to the number of students, and this to the *euse* and almost *certainly* with which the doctorate was secured, added to the already deplorable situation, a potent factor operative in still further subtracting the little good remaining, from what constituted the medical curriculum. Reference is had to competition, and as this was not conspicuous for a high order of moral principle, there soon existed a variety of inducements for students in other pursuits, such as pharmacy and dentistry, to engage, *at the same time*, in both these and medical study. Obtaining the series of degrees was made possible by modifications of the curriculum for each, under conditions of abridgment in time, curtailment of the work, and reduction of expense, and thus became possible, a man "technically" learned and skilled in three professions after a period of so-called study, inadequate for anyone! It would be an injustice to the medical college if omission were made of the fact that here and there throughout the land, one would evince pangs of conscience and offer inducements to students to devote an additional year to work by according the privilege, without extra cost, of attending the course of lectures during a third so-called year. Again, attendance upon "the clinic" was now and then announced to be compulsory. These feeble efforts effected conditions favorable to the ultimate establishment of a three-year curriculum and be it recorded to the credit and renown of the very few colleges possessing the moral courage to do so, that their initiative, brought about emulation and finally established the three-year curriculum.

Before departing from this phase of our subject, one feature connected with the manner and method of teaching requires description, because its disintegrating influence and power is recognizable as a potent factor obstructive to reform, even in the present. Fundamentals are, without exception, acknowledged to be essential for the intelligent study of any learned vocation. For medicine, the fundamental sciences of anatomy, physiology and chemistry are indispensable, and to explain to this body why, would be an unpardonable affront, but to describe how, prior to legislative requirement, these sciences were treated, is necessary for a realization of the subject under consideration.

The branches named, were presented entirely as abstract sciences, and would serve the purposes of an artist or sculptor and even an agriculturist, almost as well as the doctor. The professors superficially and hastily rattled over the merely descriptive features, in a manner that really wasted valuable time, for, the results to be achieved could have been more certainly secured by utilizing the time spent in the lecture-

room in memorizing a text-book. The practical side was almost totally ignored or treated by methods which to the student, ignorant of its value, gave the impression of insignificance and, consequently, received at his hands, little or no attention, and this especially prevailed as the examinations in these branches simply required the ability to repeat in series mere facts, such as were included in naming the branches given off from a principal artery, or the bones with which one or another articulated. 'Twas a system based on *memory* and *not knowledge*. The distinctively medical character of these sciences did not constitute a course of special teaching or study, and there were no established professorships in these relatively greater and far more important phases of the subjects. All of this resulted in a most disconnected series of lectures, and a non-systematized course of study. No attempt was made to so arrange instruction that a correlation of one with the other was maintained, and the essential conditions for intelligent growth and development in medical knowledge and skill, were not afforded.

Under such defective methods, was it possible for a student to comprehend his work? To-day inquiry discovers the fact that this feature is still prevalent, and, with few exceptions, constitutes a characteristic of the modern curriculum.

The significance of these conditions is apparent in contemplating the controversy resulting from a conflict existing between the requirements of medical law and the customs prevailing and characterizing the majority of the medical colleges.

Conventionalism as applied to medical education, afforded and still affords advocacy of these older and defective systems of teaching, and when corrective measures were attempted, the power and influence of established custom, discovered support for the active opposition to efforts at reform, but after repeated and persistent attempts, an act of assembly was finally enacted, the purposes and intent of which will now engage attention. The chief end to be secured is succinctly but clearly defined in the introductory paragraph, and reads as follows:

Whereas, the safety of the public is endangered by *incompetent* physicians and surgeons, and due regard for public health and the preservation of human life *demands* that none but competent and *properly qualified* physicians and surgeons shall be allowed to practice their profession: Section; et seq. Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania, etc.—Two bodies administer the law.—One the medical council, the other the three boards of medical examiners. The function of the medical council is

to adopt the questions which the boards are to submit to candidates applying for examination for license to practice. The council is composed of lay and medical members, and to the latter is delegated the function of selecting the questions. The former have no responsibility in this especial duty, and are utterly ignorant of the questions which are made official.

It passes upon the eligibility of candidates for examination, and in determining this qualification is governed by the following legal exactions.

Section XIII. From and after the first day of July, Anno Domini, 1894, any person not there before authorized to practice medicine and surgery in this State, and desiring to enter upon such practice, may deliver to the secretary of the medical council, upon the payment of a fee of twenty-five dollars, a written application for license, together with satisfactory proof that the applicant is more than twenty-one years of age, is of *good moral character*, has obtained a *competent common school education*, and has received a *diploma* conferring the degree of medicine from some legally incorporated medical college of the United States, or a diploma or license conferring the full right to practice all the branches of medicine and surgery in some foreign country. Applicants who shall have received their degree in medicine *after* the first day of July, 1894, must have pursued study of medicine for at *least three* years, including three regular courses of lectures, *in different years*, in some legally incorporated medical college or colleges, *prior* to the granting of said diploma or foreign license. Such proof shall be made, if required, upon affidavit. It may here be incidentally remarked that the blanks the applicants fill out, constitute an affidavit. Upon the making of said payment and *proof* the medical council, *if satisfied with the same*, shall issue to said applicant, an order for examination before such one of the State Boards of Medical Examiners, as the applicant for license may select.

It also passes upon the report of the examination conducted by the board and issues licenses to those who have successfully complied.

The required medical standard embodies the ability to pass by having attained a general average of 75 per cent. Examinations are conducted in writing, in accordance with the rules and regulations prescribed by the medical council, in the following branches: Anatomy, physiology, hygiene, chemistry, surgery, obstetrics, pathology, diagnosis, therapeutics, practice of medicine and materia medica.

The function of the examining board is to conduct the examination, grade the papers, and submit a report to the council which sets forth the results.

Analytical study of the act of Assembly discovers a few self-evident facts. First, the law is of the nature of *police* legislation and implies the *necessity* for such a measure being in force; its provisions, while self-evident, are so phrased as to disclose that, in order to secure its enactment, compromise features were necessarily incorporated. It is therefore a *compromise law*!

The reasons for this are apparent from the brief review submitted in the presentation of these remarks, and are rendered easy of recognition by a study of the following quotation from Section 13: "And after the first day of July, 1895, such applicants must have pursued the study of medicine *for at least four years* (now please especially observe) including three regular courses of lectures, in different years, in some legally incorporated medical college, or colleges, prior to the granting of said diploma or foreign license." In the light of the knowledge we now possess, need further comment be made? The question naturally presents, wherein is the difference between the legal requirement of the conditions upon which the granting of the license depended prior to July 1, 1895, and after? The answer is, the pursuit of the study of medicine respectively for three and four years. The law has been operative for about six years, and what has been its result? Conspicuously is apparent the fact that the medical curriculum has had added, two extremely important branches, pathology and hygiene. The former is a *sine qua non* to the comprehension of practical medicine. Its intrinsic properties render it an absolute essential for the understanding of the principles of medical science and the cultivation of its art. Hygiene is an absolute essential to that vitally important subject, preventive medicine, and for its mastery, demands on the part of the student and practitioner, a well-grounded knowledge of those sciences, intimately related to physiography and climatology, as well as the laws of travel, commerce and trade, which are operative in epidemiology and kindred or allied branches.

The medical college has established a four-year curriculum which includes the required subjects, and for their study has founded and equipped laboratories and hospitals essential for the mastery of the principles and acquisition of that skill which the clinician in his official capacity must possess; *at least the catalogue so states.*

The diploma conferring the degree in medicine, proclaimed to have been granted, only on conditions which have just been briefly stated, admits to examination for license and to test of the genuineness of the credentials, those confronting the situation. Sufficient has been said to demonstrate why the question presents such an abnormal relationship as exists between medical education and medical legislation. It makes

plain why the type of law which governs or conditions practice, actually partakes in character of the same properties which imparts identity for each factor operative in qualifying the clinician, and also prepares us for understanding the nature of the problem which is in process of solution.

To longer dwell upon the few details of our subject, is not essential for the purposes of this evening, and there remains in conclusion to simply state some facts concerning medical education, elicited by the application of the law governing practice in the State of Pennsylvania.

On file at Harrisburg are the papers of the candidates, who, for several years have undergone the State examinations. These papers are open to the perusal of all disposed to avail themselves of the privilege. A large percentage represents those who failed to obtain the necessary average for license. All represent those who possessed the diploma conferring the degree in medicine by some *legally incorporated* medical college or colleges.

A study of the papers of those who failed, prove that that medical college which granted the diploma, bestowed a right upon him who did *not* possess a competent common school education; him who was extremely illiterate and even densely ignorant; him who *could* not comprehend the meaning of the most ordinary and commonly employed technical terms; him who was grossly ignorant of the more prominent facts of such of the fundamentals as are associated for illustration with the heart in anatomy, and the circulation and digestion in physiology; him who it was difficult to discover to possess a comprehension of one topic of the several included in the examination.

More serious, and worse than these, was discovered the existence of methods formulated with the end in view of *acquiring money* under conditions as base and unprincipled as characterized the system described which rendered compulsory the establishment of protective medical legislation. More than one regularly incorporated medical college of these United States, distributed circulars announcing a summer course of medicine, which covered a period of six weeks' work.

This period of study terminated in time for him who obtained the diploma, to present the same as a credential for examination in Pennsylvania, but what were the conditions? Students who had *failed* to pass their college examinations and yet had studied medicine three or four years as the then operative demands required, including three regular courses of lectures in different years, in some legally incorporated medical college or colleges, matriculated in the institutions to which reference is made, and after attending or not the six weeks' course as their inclination or moral sense determined, received the diploma and attempted to practice the outrageous fraud upon our State. Happily the

discovery was made, and measures adopted to put an end to such practices.

These facts demonstrate that two motives actuate the powers operative in medical education, one, mercenary, wanting in principle and base, the other, sincere and conscientious and exponent of the highest type of moral character, and thus in the efforts to secure that for which medical legislation was intended and made necessary, is there recognizable the ever-present warfare that wages between evil and good, wrong and right. A curriculum adequate to supply competent physicians and surgeons is the end in view, the problem so easy of solution. The law formulated by those best able to judge, exacts four years of medical study, not technical, but practical, *actual* and *real*, and it should be the unalterable purpose of those representing medicine, whether as clinician or college professor, to do all within his power to render secure the establishment of so desirable and essential an end.

DISCUSSION.

DR. W. W. KEEN opening the discussion, said that Dr. Beates' paper served as a peg on which to hang his (Dr. Keen's) remarks, because the paper bears on a general subject that has been discussed for some time, both in the medical and lay press. The sketch given by Dr. Beates of medical education that existed in his day and also to a worse extent in that of Dr. Keen is a very lamentable one. The encouraging feature is that medical schools have emerged from that state of real darkness into a very much wider and better scheme of education. The point however that impressed him especially in the action of the medical council, is the relation, as it exists, between the medical council and the college. It is observed in the first place that the rule that has been laid down by the medical council is laid down by a body of seven gentlemen, three of whom are doctors and four are not doctors. Three of them are not concerned in education in any way whatever. The fourth, the superintendent of public education, is distinctly an educator, though not a teacher. How many of these seven possess college degrees was unknown to the speaker, but it seemed to him that the law is defective in the respect of giving to a body, the majority of which does not consist of medical men, and none of the seven being teachers, the right and the duty to supervise the medical education of this Commonwealth.

Moreover, in the recent legislation, or at least in the recent decision which the medical council has enacted, that four years of instruction in a medical school are required, it would seem that the medical council has gone beyond what the law itself requires. The law read by Dr. Beates is, that the student must have pursued the study of medicine for four years of which at least three have been in a medical school. By the very words "at least three shall have been in a medical school" it proposes that the fourth may not be in a medical school.

In the literary colleges there has recently been a large scientific develop-

ment in which many of the studies which are pursued, especially in the first year of the medical schools, are pursued even more thoroughly and more carefully than in the medical school itself. For example, last winter a young man who had gone through the department of biology in Brown University entered the Jefferson Medical College and was permitted to enter its second year he having pursued certain studies which the Jefferson catalogue made it possible to do. These studies with the exception of some human anatomy and materia medica practically covered the studies of the first year at Jefferson. He preferred however to pursue all the four years in the medical school because he wished to make his course a more thorough one. After he had been there but a little while he came to the dean and stated that the studies he found he was required to pursue in the first year were precisely the same as he had had already at the University and that therefore he was practically wasting time by going over the studies covered by the preceding years in the college.

The objection made by Dr. Keen to the ruling made by the medical council was not in any sense because he desired either to shorten the medical course or to make the medical education given to such a student less thorough, because he wanted earnestly to bring into medicine the best class of men that can be had, that is, the college men. He said that if a college man, a graduate of any one of a dozen of the best institutions in the land, is admitted to the second year in a medical school, that man, by reason of his training, general education and culture, is able to grasp the topics presented to him and at the end of three years of medical study would be a better educated man, and a better doctor, practically and theoretically than the man who without the college course pursued four years in a medical school. Dr. Keen did not believe it is recognized precisely how large a part the college bears in the medical education of the present. In order to determine this by statistics he recently addressed a letter to the deans of several medical colleges, asking them to give him the number of professors in each school, and to state how many of them had an academic degree and the number that had not, as shown in the accompanying tables:

TABLE GIVING THE NUMBER OF TEACHERS OF TEN MEDICAL SCHOOLS WHO HAVE RECEIVED ACADEMIC DEGREES.

	Professors.	Degrees.
² Johns Hopkins University	33	21
³ Cornell University { New York	81	74
Ithaca	25	
¹ Harvard University	31	31
² Rush Medical College	40	30
² University of Pennsylvania	21	8
³ Medical College of Ohio	43	20
² University and Bellevue Medical College	38	30
¹ College of Physicians and Surgeons	31	24
³ University of Buffalo	64	21
² Jefferson Medical College	28	17

435

276=63.5 per ct.

¹ Professors only.² Professors, Clinical Professors, Assistant Professors, Associate Professors.³ Professors, Clinical Professors, Assistant Professors, Associate Professors, and Instructors.

TABLE GIVING THE NUMBER OF TEACHERS IN THE MEDICAL SCHOOLS OF PENNSYLVANIA WHO HAVE RECEIVED ACADEMIC DEGREES.

	Professors.	Degrees.
University of Pennsylvania	21	8
Jefferson Medical College	28	17
Medico-Chirurgical Medical College	26	17
Woman's Medical College	29	12
West Pennsylvania Medical College	21	14
Hahnemann Medical College	16	10
	141	78=56.2 per ct.

This shows that of 435 men, who were teaching, 276 or 63.5 per cent. were graduates of colleges and possessed academic degrees and that 159 or 36.5 per cent. were not. Practically two out of every three were college men. When to this is added the considerable number of men who are teachers who never graduated, but who passed one, two, or three years in college and then went to a medical school but who were men largely dominated by the influence of college life and culture, the percentage would be at least three out of every four. The college men are the ruling factor to-day in college life and instruction. If the course advocated by the medical council requiring four years of daily work in a medical school irrespective of any preceding work is to be pursued, one of three things will be done: Either (1) the college man will go directly into the medical school, or (2) he will pursue two or three years in college and then go to the medical school; in either case getting an imperfect preliminary education; or (3) he will go to some other college in another State; and, the best men will be driven from medical colleges in Pennsylvania.

In his remarks Dr. Keen therefore pleaded for the college man in medicine because he is the best educated man, because he is the man who has the broadest grasp of medical education, because he will be the man who will be foremost in medical education, in research and in practice.

Dr. H. C. Wood said he agreed with Dr. Keen in his main statements, but that someone should point out that what he had said had little relation to the subject in hand. No one will contend that a college education is not a good thing nor that the man who has a college education starts the better furnished than the man from the public school. This, however, is absolutely foreign to what is before the Society. If Dr. Keen's argument means anything it means an arraignment of Jefferson Medical College and of the medical colleges of the whole country. The question is not whether a man is or is not better for a college course, but whether the medical college can teach medicine better or whether the ordinary college can teach medicine better; whether the first year of medical instruction should be placed in the hands of the ordinary lay college faculties and they be allowed to teach, or whether medical schools shall teach medicine themselves and let the colleges take care of themselves. If there is to be any dwarfing in this matter, it had better be done in the general than in the medical education. If there

is to be a reduction in the number of years which the State of Pennsylvania now requires it ought to be a reduction on the part of the colleges. If it is better for some young men to receive their first year of medical education in the college, it is better for all the medical faculties to resign and allow the literary colleges to teach them. It is a question whether medical schools shall teach medicine and the colleges teach general culture, or whether one shall be sacrificed to the other, and which shall be sacrificed. At Princeton recently, Dr. Wood was asked by some of the students whether it was better for them to enter the first year in the medical school of their choice, stating that they would enter the first year if it was best. It is a mere surmise based on nothing that any man will give up his college education because he has to be properly educated in medical education afterward.

There is another serious side to this question. The colleges themselves in America have been pushing their requirements for entrance examination upward, little by little, and have been continually elevating their standards for graduation, until they have become too high for the needs of practical life; and now the colleges are substituting technical training for general education; whereas if they did what is needed they would either reduce their entrance examinations or make their courses three years instead of four.

The man who graduates in a literary college is certainly better fitted for the practice of medicine than one who does not; but the man who leaves college at the end of three years, and directs his course properly afterward, is very much better prepared for the practice of medicine, and will out-distance the man who stays four years in college. Suppose a man is fit for college at eighteen, which is about the average year; if he spends three years in college, four years in medical study, one and a half years in hospital life, one and a half years abroad, he will be when he starts on practical life twenty-eight years of age, which is as late as a man should enter into practical medical life. If he carries over his education longer he will almost certainly find all the hospital and other advantageous positions occupied by men of his years who have preceded him. Such a man will have spent no more money than the man who stays four years in college and does not go abroad, and will be far better fitted in knowledge of the world, in knowledge of medicine, and in general culture itself, for life, than will be the purely college-bred man. The speaker has yet to meet any man, educated in an American college, who knew any language save English, unless he had learned such language outside of the college. The college student can talk neither Latin, Greek, Hebrew, German, French or anything else except English; whereas the man who has been abroad ought to be able to speak for all practical purposes three languages, and to read French and German almost as easily as his mother-tongue. What the colleges should do is to so adjust their courses that they could turn over their graduates at twenty-one to the professional schools. Harvard University has already done this; the dean of the Harvard Medical School said not long ago that it was supposed all the minor colleges of New England would do it; and why should the

Pennsylvania colleges, in the worship of the fetich of four years, be interfering with the technical schools.

PRESIDENT JOHN S. STAHR, of Franklin and Marshall College, confessed to some embarrassment in appearing before a medical society to engage in a discussion of medical education, as that was a little beyond his sphere; and he did not like to talk with any degree of positiveness on a subject on which he could not claim to be reasonably well informed. There are aspects of the subject which he would not consider himself competent to discuss at all. There are other aspects, however, on which he had decided convictions, and on which he thinks he had a right to have an opinion.

He took for granted that medical colleges like the literary colleges of the State carry forward their work in accordance with sound pedagogical principles. There was a time when, perhaps, that could not be claimed, when the study of medicine was a good deal of a haphazard undertaking, and the work of a medical college was not properly graded. But in these days all are Herborations in the sense that they believe in the correlation of studies; that there are certain studies that properly go together, and, of course, that there must be a proper order of succession; the simpler, the more elementary, must precede, and the others which involve more must follow. He had not one word to say in the way of suggesting to medical schools and medical professors how they ought to grade their work, and how they ought to correlate their studies. The medical colleges and the literary colleges no doubt aim at securing the best possible results by proper co-operation between the different kinds of schools. He was very glad to hear Dr. Wood say that he fully appreciated the importance of a college course as preliminary to the study of medicine; but somewhat surprised to hear him say that one might get too much of a college education before undertaking the study of medicine. It may be admitted that there is that which goes for a college education, which, perhaps, has little bearing on medical study; but that is not the kind of education offered by the colleges of the present day.

The colleges of this Commonwealth have ceased to be, if ever they were, institutions that look merely to ornamental education, and that confer degrees only for literary culture. Culture is a desirable thing; but the best definition of culture, perhaps, is, that it is that which brings a man in touch with his environment, and makes him feel thoroughly at home in the work which he undertakes. It opens to him the world in which he moves, and leads continually toward a better world, that is to say, the world of the humanities, of literature, and art, and science. He did not believe that a man can have too much of that to take up the study of any profession, and therefore not too much to take up the study of medicine. A college course, first of all, stands for discipline. The student must meet real difficulties and overcome them. He wants not only to study the languages, history, and kindred branches, but science as well; and he wants to study how to study; he wants to learn to investigate as he proceeds. In a properly equipped college a man gets not only literary culture, but also a regularly graded course of scientific study, beginning perhaps in the sophomore year,

with the study of biology in the laboratory, becoming thoroughly familiar with the different forms of animal and vegetable life; taking up chemistry and studying it, so that he is not only able to perform certain experiments, but that he also understands the different chemical substances, and knows how to analyze them; taking up embryology, bacteriology, physiology, histology and human anatomy. The last study, of course, is not pursued to the extent it is in the medical school, and yet it is successfully taught.

DR. S. WEIR MITCHELL asked if any of the colleges teach human anatomy at all, and to what extent?

PRESIDENT STAHR: Yes, the students dissect; they have their cadavers and study human anatomy under the instruction of a competent teacher, a graduate of a medical college, a gentleman of ability and prominence in the medical profession, and they work precisely as they would in the medical school. He did not mean to say that they had all the appliances which they have in the medical school, but that the work, as far as it went, was thoroughly done. Now when a young man has gone through college in that way he has acquired a certain amount of knowledge which is of immense importance when he comes to study medicine. He has formed habits of study which qualify him to undertake the work of his professional course, and is able, as Dr. Keen has said, to accomplish for that reason more in three years than a man who has had no training of this kind will accomplish in four. Of this fact the speaker felt thoroughly convinced; but he thought that the colleges of the State had no desire whatever to abbreviate the course of medical instruction. If the medical colleges of this State are prepared to say they shall require such and such qualifications for entrance in their classes (say the degree of A.B.), and exact four years of study from every man who enters, the literary colleges will say, amen; but if the medical colleges say that boys who have just come out of the public schools will be admitted to study medicine and will take their four years' course and will be put side by side with those who have graduated from college, and have practically covered the required amount of one year's study in the medical college—if the medical colleges say that college graduates will have to do that the literary colleges shall prefer to send their students to medical schools where the students will be required to be A.B.'s, and where they will stand side by side with men of their own calibre. Then, it is to be feared those who have the best qualifications for high standing in the profession will be driven out of the Commonwealth, and will take up their studies elsewhere. The speaker was desirous to see an understanding arrived at between the medical colleges and the literary colleges of the State. He thought there should be a conference to see what could be done and he believed that by working together it would be easy to advance the standard of medical education far beyond what it has been in this Commonwealth.

PRESIDENT ISAAC SHARPLESS, of Haverford College, said that as a Pennsylvanian and one deeply interested he would enter a plea for some effort at co-operation, some conference between the two parties interested, the literary colleges and the medical colleges. The difficulty seems to be that

each set of instructors is desirous of having a way which it considers the best and neither is willing to yield anything. Those who have studied the conditions in France and Germany have found that the boy of sixteen is as far advanced as the boy of eighteen in America. The reasons for this are various; one is the scarcity of good teaching here; another is the absence of regular gradation from the lowest to the highest courses of study. There is a great duplication of work.

He did not know of any point in the whole line of education which is more serious than the break which exists between the college and the medical school. It is to be assumed that college education is a good thing, and that if in some way the college may be connected with the medical school, the whole difficulty will be solved.

He agreed with Dr. Wood that the medical college can teach medicine better, but he did not know of any inherent reason why biology and chemistry could not be taught as well in the second, third and fourth years of college. This work in the college is not crowded into one year, but scattered through two or three. The college does all that the medical college does on these subjects. He had this from the testimony of a large number of young men who have pursued these courses in the literary colleges and afterward gone to the medical colleges of the State of Pennsylvania. He quite agreed with Dr. Stahr that if the medical colleges of the State will advance their requirements so as to demand a college degree so that the graduates of literary colleges can take up the work where they leave it off, the literary colleges will be more than satisfied with the conditions. The difficulty with which the literary colleges contend is that none of the medical colleges of the State of Pennsylvania require more for admission than admits to the Freshman class of undergraduate colleges. A graduate of one of these colleges has to go into a class in association with men who are four years behind him in general maturity. If he can have new studies in association with men who will be something of a stimulation to him he would be glad to spend four years in a medical college, but if he has to go back over work which he has already done it is a waste of time. The effort of all educators has been to save time in the courses. The same conditions they have in France and Germany could be achieved here, and students could enter college at sixteen if the schools were supplied with the proper teachers and systems. The question of saving some time in the transition from the college to the medical school should also be considered. It is doubtful whether any institution with the interests of education at heart has a right to fix a standard without regard to other institutions. It has the power, but it is doubted to have the right. No institution has the right to do that which is to the disadvantage of the cause of education all along the line. President Sharpless knew personally of young men who have the subject under consideration as to whether they shall attend medical colleges in this State or elsewhere. Some are going to Baltimore next autumn because they have supposed that if they enter the Pennsylvania medical colleges it will be necessary to do again the work they have done and either loaf away a year or do work not

required by their courses. It is a practical question for all, a consideration of which, education all along the line demands.

PRESIDENT E. D. WARFIELD, of Lafayette College, said he heartily agreed with what had been said by the representatives of colleges. The literary colleges desire to guard against incompetent men getting into the profession, but it is not desirable to make such an arrangement that no man of genius, who is restricted by conditions of life, cannot overcome them and thereby be excluded. Evidence of undoubted medical attainment must be accepted and a rule of four unbroken years of medical study should not be laid down. This is a position in which the rights of others are always to be considered; and one of the first rights that other people have, is to have an opinion recognized in a free State like Pennsylvania. In the organization of this whole process of education there has been the recognition on the part of the college men, that those who want to go to the high school and then to the medical school should have the right to do so. There has, scarcely, been a man rejected from the Freshmen class of Lafayette College, who has not gone to one or other of the medical colleges and graduated two years in advance of men who had gone through the college course.

When President Warfield, nine years ago, became President of Lafayette College, he was not satisfied with the department of biology and the kindred branches. He consulted with representatives of the schools in Philadelphia and New York and on the basis of the investigation, the department of biology at Haverford was reorganized. Instead of making it a one year's course as provided in the medical schools here, it was decided to begin the work which was preparatory to the study of medicine in the junior year and give to it two and a half years. This is the method in which it is carried out. There is in the faculty four graduates of medical schools, and one who has taken a course, but not a degree. This body of men have all been interested in this work. There are laboratories and the men are divided into as small groups as possible, in order that the instruction may be personal. The product is superior to the results of the larger classes found in the first year of the average medical school. Put these men alongside of men just graduated from the high school who are not acquainted with the use of the dissecting instruments and they have a very decided advantage.

DR. S. WEIR MITCHELL asked Dr. Beates the definite relation which the members of the Council bear to this question, because as he (Dr. Mitchell) understands the late decisions, such a condition, however reasonable between the medical schools, is not possible under the present ruling of the Council. Dr. Mitchell asked whether that is not the case.

DR. HENRY BEATES, JR., said that a somewhat anomalous position had been occupied, in that a paper has been presented on one subject, a discussion introduced upon another, and a third insinuated. The situation can perhaps be more completely and briefly met, as the hour is late, by replying to President Stahr who, in discussing medical education, has sounded the keynote of the whole matter. President Stahr *presumes* that the medical curriculum is administered on pedagogical principles. In meeting this issue, one fact

stands out conspicuously, and it is, that in this whole matter, the essential need consists of an adequate medical curriculum which, when mastered, will supply *competent* clinicians. This implies that sufficient medical knowledge should be imparted and ample instruction and opportunity for study afforded and especially the necessary time supplied to properly fulfil the obligations of these conditions. Above all, the whole administered on the principles of pedagogics, and, in considering the adjustment of a system of general education to that of the special or medical, it is necessary that the conditions of the one be correlated with those of the other.

There were present the representatives of the faculties of the several colleges of medicine of Eastern Pennsylvania, and Dr. Beates inquired whether the medical curriculum in the institutions they represent, is administered on the principles of pedagogics? (There was no claim to such a system.) As President Sharpless has intimated, is there present in the method of administration of the curriculum, that regular gradation which leads the student from the beginning to the termination of a systematized course of instruction in a manner conforming with pedagogical principles? Does the professor of anatomy, for illustration, treat on the embryology of the blood; and the professor of physiology on the physiology of the blood? The professor of practice, on the diseases of the blood? The professor of pathology, upon the pathology of the blood, and the professor of therapeutics, upon the therapeutics of the blood? Inquiry certainly fails to discover any effort as even having been made to so arrange the course of instruction that the students are led, step by step, as the understanding of pedagogics causes it to be *supposed* to be done. Each professor acts as independently one of the other as though an official of a foreign institution.

The absence of such systematized work in the medical college is a most glaring defect. It is claimed that in the biological course of the leading literary colleges, such branches as are taught both there and in the medical college, are better taught by the literary college. That this obtains in so far as the greater number of medical schools is concerned, cannot for one moment be questioned, and in admitting this fact, there is suggested a great need on the part of the medical college for the discharge of a duty which is, that the work in the so-called fundamental branches should be the equivalent, if not greater, than that of the literary college.

How advantage is taken of this disparity of work, is best illustrated by the following letter from Professor Vaughan, Dean of the Department of Medicine and Surgery of the University of Michigan :

DEAR DOCTOR : I am very glad indeed to know that your board intends to require four full years of actual medical study.

The practice of allowing students from literary colleges and academies to enter the second year class in the medical school, is doing great harm to medical education in this country, and tends to neutralize the good that has been done by State Boards of Medical Examiners. Many small colleges and academies are now giving what they call preliminary medical courses.

As a rule, the work in these courses is done in a very inferior manner. This practice is growing constantly, and I am frequently urged to grant one year's time to students who have graduated at colleges that are but little better than high schools. We have always held our students to certain definite medical work. We have given credit for certain branches taken at Cornell, Princeton, Yale and other good schools, but we have never done as many other schools are constantly doing when they grant one or two years of time to graduates of literary colleges. I hope that your board will be able to sustain the position that you have taken, as I believe it will be for the betterment of medical education. Please understand definitely just what our position here has been on this matter. If a student has taken elsewhere a course in chemistry equivalent to that given to our own students, we may give him credit for such a course, but we do not give him credit for a year's work because he is a graduate of a literary school.

Respectfully,

V. C. VAUGHAN.

(Signed.)

When therefore there shall exist a medical curriculum ample and complete, administered on the principles of pedagogics, one can intelligently consider the correlation of the work to be done by those possessing general culture, with that required for the medical curriculum.

The point raised by Dr. Roberts of four years of medical study, three in college, as the law reads, and one somewhere else. Where is this somewhere else? What are the studies and how pursued in this unknown somewhere else? The Medical Council in faithfully discharging its duties in accordance with the demand of the law it administers, was obliged to interpret the legal requirements of the Act of Assembly governing practice in this Commonwealth, and in expressing itself, it very fortunately used the term "exclusive." The adoption of the word was as intentional as timely, and had for its object the discovery of the very facts which engage the attention of the meeting. It is puerile to suppose that in the etymological sense of the word, a student in medicine is expected to do nothing but exclusively study medicine from sunrise to sunrise. The intent was to declare that such work as the Medical Council is legally obliged to exact, is similar to that characterizing the work of the second, third and fourth years of study. The Medical Council then, simply demands what the law compels it to, that four years shall be devoted to the study of medicine, each one of which shall be of the same type, honestly mastered, as characterizes the work of any one of the three advanced years of the medical college course. The first year work, elsewhere done, must necessarily be of such character as will enable those admitted to advanced standing to intelligently proceed in that regular order characterizing growth and development of mind, with the second and subsequent years of the curriculum.

The employment of the term "exclusive," has served its purpose better than was expected, and enables all who are interested in the subject, to discover the conditions obtaining, as well as the necessities to be met.

That the Medical Council discriminates against college-bred men, is an imputation utterly without foundation, and unjust. It does *not* discriminate against college men. There is however a very vital point worthy of most serious consideration. It is that the requirements of the medical curriculum, such as have been indicated should be a course of medical study, can be mastered thoroughly and well by the great number of young men who have not, by reason of financial and other environment, the opportunity or the time to acquire degrees in the humanities as well as in medicine. The actual question before the meeting presents, that a student of medicine must be adequately educated to pursue the study of medicine in a masterly manner, and be able to cope with all of its problems, as now known, that can present. That degree of preliminary culture is essential; anything more is superfluous and a medical college that has an entrance examination which proves men to be competent to accomplish the task they undertake fulfils its duty. Let medical schools have college men, but do not ask that either the curriculum leading to a bachelor's degree or to the medical degree, be in any way abridged or its work diminished.

Dr. Beates was glad to welcome the resolution submitted by Dr. Keen. It is however a distinction without a difference. It demands nothing more nor less than the resolution now in force and adopted by the Medical Council. It simply requires that a student in the medical college to be admitted to the second year of the medical curriculum, must have done, honestly and completely, the work of the first year of the medical college, and it is hoped that this Society will vote for its adoption for it supplies moral support to the Medical Council.

PRESIDENT W. W. BIRDSALL, of Swarthmore College, said the question, "Why should young men and women of average ability go to college?" has been propounded to a large number of men of experience and of alleged wisdom, and the answer which struck his particular attention was something like this: The reason is the same as that which requires that crude ore should be assayed; in order to determine its qualities; to develop its fitness; to find out exactly what it is good for, and to devise means for its application to those purposes. As he thought over that statement and compared it with an experience of almost a quarter of a century in teaching boys and young men he is more and more convinced of the truth that one at least of the chief functions of what is ordinarily called education is to determine and develop the qualities of youth, to find out what is in the man, to bring it to its perfection and to fit it for application. As he reviewed his experience in college he was astonished at the number of boys and young men who determine their profession late in their educational course. They are of the very best; young men who come to manhood with the future course undetermined, not from lack of power, but sometime from the plenitude of power. College courses are adapted to this end and it is one of the chief gains of these recent decades of progress in education that this is true. The college course has been enriched with a variety of laboratory work. Young men go through Swarthmore College taking the courses in chemistry, physics, and

electricity and go out into the world prepared to enter the profession to which these sciences lead. They study biology and the allied sciences, and, knocking at the doors of medical colleges are they to be told to go back four years and take their places with boys just out of the high school? This process is in itself preventive of the best results.

The literary college is met by the proposition that the medical colleges can teach medicine better than the colleges, and if the teaching of medicine pure and simple is the subject discussed, it is true. President Sharpless pointed out, however, that the studies of the first year of medical colleges do not pertain exclusively to medicine and that they may be as well taught in the literary colleges as in the medical school. One must rejoice at every well considered effort to promote the cause of professional training. Why then should the college man be cut off? Does experience show that he has failed? The percentage of college graduates who have failed to distinguish themselves in the practice of medicine will be found to be far below the percentage of failures among high school graduates who have entered the medical college direct from the preparatory school. He had before him a few days since the record of nine-tenths of the men who have graduated from Swarthmore College and almost every man who has gone into the practice of medicine has made in it what may be called a distinguished success. There is no one among them of whom the college may be ashamed. If the men entering the second year from the college have not failed, why cut them off? It is not they who misspell the words; nor they who fail to understand the questions. The college men have never lowered the standard of the medical college. If that be true, why not come together upon the basis of the last resolution of the Medical Council? For his part he was perfectly willing that every graduate of Swarthmore College who aspires to enter the second year of a medical school should go up and be examined and demonstrate his fitness. In setting up the standard for entrance into the medical colleges he asked that the situation be viewed as it is; that there is in view the promotion of general culture and the encouragement of young men of parts to first educate themselves well and then go into medicine. Too much is presumed upon the idea that the young man knows where he is going before he starts; he does not always know and it is not always the best man who does know. It is probably true that some men are fore-ordained to be doctors, and some are condemned from birth to the condition of teachers, but it is a saving fact that this is not true of all men; that men grow in their capacities and in their aspirations as they develop and mature. Let them be given an opportunity to develop their fitness and their powers. He believed with all his heart that culture is good; that no man can have too much of it. He perfectly agreed with Dr. Wood that there may be a sacrifice, that men may sometimes pursue general culture too long for the best success, but he was reminded, in that connection, of the president of a college, who, when a young man asked him whether he could not take a short course, said, "Oh, yes; oh, yes; but that depends upon what you want to be. When the Lord

wants to make an oak he takes a hundred years; it only takes five months to make a squash."

In closing, President Birdsall repeated his belief in the value of culture. It is as good for the doctor as for the lawyer, as good for the man of business as it is for the doctor. Let there be co-operation in the schemes of education looking to its encouragement.

DR. JAMES TYSON, in view of the lateness of the hour and the fact that the whole subject had been covered, said that he would simply add that in over twenty-five years' intimate relation with medical students he had found that the college man always filled in the highest degree the requirements which lead to the most thorough medical education and training, and that it is he who, in the majority of instances, has attained the highest success in all that goes to constitute the scientific physician and useful practitioner of medicine.

In regard to what constitutes a medical education, there is a good deal of room for difference of opinion, but if Dr. Beates' definition be adopted, chemistry should be omitted from the first year of the medical curriculum—a step for which the medical colleges are scarcely prepared. As to biology, except as far as the subject is covered by physiology, his impression was that at the present day the colleges furnish more instruction in that branch than the first year of any medical school of which he had knowledge.

Finally, his opinion was that the preparation which is offered by the colleges in their special curricula preparatory to medicine is more than equivalent to the first year in the average medical school, and until the medical schools are ready to demand that every matriculate shall have a degree in arts or its equivalent, he thought some acknowledgment should be made of the preparation brought by the college graduate who has pursued the course preparatory to medicine. The first year of medical education is highly elementary, and until it becomes modified to include what the college graduate has a right to expect for his further development it is not right to force him to enter the first year.

DR. JOHN B. ROBERTS said that the discussion had drifted away from the original question. Dr. Keen took the ground that the Medical Council of Pennsylvania required that a man must study four years in college. He, Dr. Roberts, asked Dr. Beates if that is the situation. He thought the first decision of the Medical Council was that the four years of study required by the medical law of Pennsylvania must be four years devoted *exclusively* to the study of medicine and that this was afterward somewhat modified.

DR. BEATES: In answering the question just propounded, it must be stated that the law governing practice in Pennsylvania, requires four years of medical study. It also specifies that three of these years must have been spent in regularly incorporated medical colleges. The question involved arose in the Medical Council, by reason of the following episode: A gentleman applying for the rights to examination, presented credentials setting forth the fact that he had studied medicine, that is, attended three courses of lectures in separate years, in a medical college, and for the fourth year offered

as a substitute, work done in pharmacy. The question as to whether or not pharmacy is the equivalent of one year of medical college work, challenged the administrative duties of the Medical Council. Inquiry was made, and discovered the fact that medical colleges commonly assume the right to accord to those engaged in the studies of dentistry, pharmacy and veterinary medicine, a whole year of medical college work. Such students are admitted to the second year of the four years' course, and thus the medical college technically appears to meet the legal requirement of the law when in reality it does not. The recognition of the abuse of this *assumed* privilege and custom, resulted in the adoption of a resolution, which had for its object a declaration by the Medical Council of its interpretation of the intent and purposes of the law, as well as to define its duty in administering the same. It also defined the proper relations that should exist between the medical institutions that had assumed the right of substituting dental, veterinary, biological and pharmaceutical work, and the colleges of these respective callings. The second resolution bearing upon the first, clearly defines what the law requires the Medical Council to exact, and distinctly states, that when the biological work, which is the point in question, covers the entire work done by the first year of the medical college, students mastering this, can legally be admitted to the second year of the medical curriculum.

Resolution No. 1 and preliminary report of committee:—

The committee appointed to determine the legal interpretation of the Act of Assembly governing the practice of medicine in Pennsylvania, begs leave to respectively report, that after due consideration it unanimously concludes that the meaning and intention of the act is, that in order to make application in due process for the rights therein contained and set forth, candidates must have studied medicine, and by this is understood the regularly accepted graded and systematic work constituting the study of medicine, for four full and complete years, and that while three of these years must have been spent in a regularly incorporated medical college or colleges, courses of study in kindred sciences are not to be substituted for any one of the exacted four years of actual medical study. It is therefore,

Resolved, That in the certificates presented by candidates to the Medical Council, when applying for the rights of examination, which set forth the actual work done, it must be demonstrated that each of the several four full and complete years of legally required medical study had been devoted to the exclusive study of medicine, and does not embody or permit as an equivalent for the work of any one year of actual medical study, such studies as are merely preparatory to the course of medicine, or phases of science which are not properly included in the regular medical curriculum.

Resolution No. 2 which defines what is understood by exclusive study of medicine and was adopted by the Medical Council of Pennsylvania, February 26, 1900:—

WHEREAS, The Act of Assembly requires that ' applicants must have pursued the study of medicine at least four years, including three regular courses of lectures in different years in some legally incorporated medical college or

colleges prior to the granting of said diploma or foreign license," therefore, be it

Resolved, That in the judgment of the Council, when the medical course of the literary college, as proved by the examination of the students by the medical college, covers the entire work of the first year of actual medical study, such course may be accredited by the medical college as the first year of medical study required by law.

DR. ROBERTS replied that it would seem, therefore, from the reading of the resolution that Dr. Keen's argument is a little outside of the question and not aimed directly at the issue which the Medical Council has raised.

It was Dr. Roberts' belief that the Medical Council has raised an issue which it has no power to raise. He believed that if the gentlemen from the academic colleges and medical schools, who have spoken so eloquently, were to see to it that the decision of the Medical Council were subjected to judicial revision by the courts, it would happen that the decision of that Council would be found to be untenable.

He based his assertion upon these facts: he had before him a copy of the Medical Law of Pennsylvania. It started out by saying this: "And the said Medical Council shall have no power, duty or function except such powers, duties and functions as pertain to the supervision of the examinations of applicants for licenses to practice medicine and surgery and to the issuing of licenses to such applicants," etc. In a later section it says, "After the first day of July, eighteen hundred and ninety-five, such applicants must have pursued the study of medicine for at least four years, including three regular courses of lectures, in different years, in some legally incorporated medical college, or colleges, prior to the granting of said diploma," etc. If the English language can be understood, this means that three courses must be spent in college; and by implication it means that in one year the student need take no course in college. Such he believed the true reading of that section, and such he knew was the true meaning of the men who formulated this law.

He thought it not improper to say that if it is desired to know the meaning of a law or a written paper, the proper thing is to go to the men who wrote it and not to the Medical Council, the agent. All know that phrases are sometimes susceptible of different interpretations. At the time this law was written it was not uncommon for men to study medicine by spending a portion of time reading medicine in a doctor's office. The provision that he must study four years, including three college courses in different years, means that he must be in college three college years, and must devote an additional year to the study of medicine. The manner of the study during this additional year is not prescribed. It is nowhere in the law stated that it must be devoted to the exclusive study of medicine. Does the Medical Council intend to require that a man coming before the Medical Council must have devoted all of the days of the four years *exclusively* to the study of medicine, that he cannot study Greek, Latin, French, German, art, biology or botany during any of the 365 days of any of those years? It seems that

the Medical Council has no right to interpolate in the law the word "exclusive." The Medical Council has gone a step too far in inserting the word "exclusive." Dr. Beates has spoken of there being no legal definition of what medical study is. It would seem that the study of medicine would comprise the study of chemistry, physiology, botany, bacteriology, histology and so on.

He believed that the Medical Council has made a mistake, that it ought to be willing to acknowledge its mistake; in fact, that if necessary, it ought to be made to acknowledge its mistake, for he believed it is essential for the proper conduct of medical education in this State that this matter should be settled.

He admitted that education cannot be too broad, that a man cannot have too good a preliminary education, but it will not do to allow any body of men to weave into the law what was not intended to be there. He knew what was intended, for he happened to be one of the committee active in having the present law enacted. The Medical Council was his own device, modelled after the provisions of the New York law, and the Pennsylvania Medical Law as it stands was almost wholly written in his office.

DR. M. B. TINKER, as a graduate of an American college and a student in a German university, said he took pride in telling his German fellow-students that he believed a degree from the best American medical schools represented fully as much as that of any medical school on earth. He was proud of possessing an American medical degree, and had always been glad to see the advances which had been made in education in this country. Two great evils, however, exist in American medical education. One is the very unequal standards of courses which are given in the medical colleges—the other the insufficient preliminary training required. According to the pamphlet of the New York university on professional education there are one hundred and fifty-six medical colleges in the United States—as many if not more than in England, Germany, and France. Some of these colleges give a very high grade of instruction; others represent almost nothing. There are only eight schools in the United States in which there are given 1500 laboratory hours, including dissection, and there are only four colleges in which there are given 1200 hours or more of clinical teaching. This is evidence that in some American medical schools there must be very little of the kind of teaching which has come to be recognized at the present time as the most important part of medical teaching—clinical instruction and laboratory work.

What is the Medical Council and Examining Board to do with the rest of these one hundred and fifty-six medical colleges, some of which are given very little laboratory work, some none at all? This should be as important a point for consideration as the admission to advanced standing of men from literary colleges.

The second great evil has been already fully considered. There can be little question as to the importance of preliminary education. Perhaps not all present to-night know that in ninety-seven of American medical colleges only the first-year course of a high school is demanded for entrance. This

is sufficient evidence that reform should begin at the beginning and first demand, at least, a high school education, and that certain schools should begin by giving adequate laboratory and clinical teaching and afterward consider the question of shutting out the college man. The medical profession seems united in favor of anything which will promote the best interests of medical education, and anxious to bring about a better grade of instruction. By thoroughly earnest efforts this very desirable end may be accomplished.

DR. W. W. KEEN said: No one understanding the English language would interpret the law to mean four years to the exclusive study of medicine. The law does not have the word "exclusive," but says "four years, three of which shall be spent in a medical school." He presumed that Dr. Beates would close the debate in a moment and he therefore offered this resolution:

Resolved, That in the opinion of this Society it is highly desirable that the relations between the literary colleges and the medical colleges should be so defined that the students of the former— the literary colleges—may be given credit in their medical course for actual work done in such elementary branches;

Resolved, That the Medical Council be earnestly requested to so revise their present interpretation of the Medical Act as to give such credit for work done.

DR. E. W. HOLMES said that from his observations in the teaching of practical anatomy he had no hesitation in saying that the second year men who had taken their biological course with human anatomy in the literary colleges do better work than the men without such preparation coming and taking the first year in anatomy in the medical school. He was exceedingly sorry that it is so but under the existing provisions it cannot be helped.

The resolution offered by Dr. Keen was re-read and adopted.

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**On Recent Advances in Our Knowledge Concerning the
Ætiology of Malarial Fever.**

BY WILLIAM SYDNEY THAYER, M.D., Baltimore, Md.

[Read by invitation, May 9, 1900.]

But three years ago the form in which the malarial parasite lives outside of the human body, and its manner of entrance into the organism, were matters of speculation. The idea, especially insisted upon by Manson,¹ that the crescentic forms of the æstivo-autumnal parasite might represent bodies "intended to carry on the life of the species outside the human body," and the view expressed also by Dock² and Mamaberg³ that the flagella, upon the functional importance of which their discoverer, Laveran, had always insisted, might represent the first stage in the life of the malarial parasite in an external medium—these were still matters of dispute.

With regard to the manner of infection there existed three main theories:

- (1) That the disease was acquired through the gastro-intestinal tract, especially by drinking water.
- (2) That the infectious agent entered through the inhaled air.
- (3) That inoculation occurred through the bites of insects.

Suggestive evidence against the idea that the disease might be acquired through the gastro-intestinal tract had been furnished by the experiments of Celli, Marino, Zeri, Grassi and Feletti;⁴ while a careful study of the literature, as well set forth by Norton⁵ revealed the utter lack of evidence in support of such an idea.

With regard to the theory that the infectious agent entered through the respiratory tracts, it could only be said that while certain general facts spoke in its favor, no positive evidence had ever been adduced in its support.

That inoculation might occur through the bites of insects, and especially of the mosquito, had become an attractive hypothesis. This theory, to which Nott⁸ had referred in 1848, was first definitely put forward by King⁷ in 1883; it was again mentioned by Laveran⁸ in 1891 and 1895. The evidence in favor of the mosquito theory, the strongest being the remarkable observations of Theobald Smith⁹ concerning Texas cattle fever, was well brought together in 1896 by Bignami.¹⁰ Experimental proof, however, of this view was entirely lacking, despite the fact that Bignami (l. c.) and Dionisi had already attempted to produce the disease by exposing patients to the bites of mosquitoes.

Manson, it will be remembered, was not at this time an advocate of the theory that the disease was inoculated through the agency of mosquitoes. Assuming, as has been mentioned before, that the crescentic forms of the parasite might represent bodies intended to carry on the life of the species outside of the human body, he put forward the hypothesis that the mosquito might act as an intermediate host for the malarial parasite, as it does for the *filaria sanguinis hominis*; that after ingestion the parasites might enter into the tissues of the mosquito, living there in some form until set free again with the death of the insect. He was inclined to think that they might be reintroduced into the human being through the gastro-intestinal tract.

In the summer of 1897 MacCallum¹² cleared up the much disputed question as to the nature of the flagellate bodies. His observation that in the *Laverania Danilevskyi*,* there exist sexually differentiated forms of the parasite, the flagella, representing the male elements, penetrating and fecundating the female forms, was the first real advance. This discovery not only demonstrated the nature of the flagellate bodies, but, from analogy with other biological processes, justified the inference that the resultant fecundated element might represent a form capable, perhaps, of development in a medium other than the blood of the animal in which it had arisen.

* In the studies of Ople and MacCallum this parasite has been referred to as the *Halteridium* of Labbé but, as Laveran has justly pointed out (*Comptes rendus hebdomadaires de la Société de Biologie*, Par., 1899, s. xi, T. I, 603), according to the rules of nomenclature, the specific name *Laverania Danilevskyi*, recommended previously by Grassi and Feletti, is the more proper term.

In the meantime Ross,¹³ working in India at the suggestion of Manson, had noted the development of flagellate bodies within the stomach of mosquitoes which had been fed upon patients whose blood contained crescentic æstivo-autumnal parasites. Later Ross¹⁴ observed in the stomach walls of several of these mosquitoes, which have been since shown to belong to the genus *anopheles*, a number of round, refractive, encapsulated bodies containing granules of pigment quite similar to that previously contained in the crescentic parasites which had been ingested. These structures, unlike any which he had previously observed in the mosquito's stomach, he suspected to be stages of an extra-corporal cycle in the life history of the malarial parasite.

Owing to the dearth of material Ross¹⁵ was compelled to continue his experiments upon birds. He soon found that on the second day after feeding the "gray mosquito"* upon birds infected with the *Proteosoma Grassii*, similar bodies appeared in the muscular coat of the stomach wall. These bodies, at the beginning, measured about 7-8 micromillimetres in diameter, showed a well-marked refractive capsule, granular contents, and a number of particles of pigment quite similar to those previously existing in the hæmatozoa. In repeated experiments Ross followed the gradual development of these structures, until, at the end of seven or eight days, their diameter measured nearly 70 micromillimetres. At this period they projected from the external coat of the stomach into the cœlom.

Soon afterward the capsules ruptured setting free a number of delicate spindle-shaped bodies, which were later found accumulated in great numbers in the large clear cells of the veneno-salivary glands. Feeding experiments proved that at this stage the mosquitoes were capable of transmitting the parasite to non-infected birds.

Early in the course of the work Ross and Manson assumed that the penetration of the stomach wall was accomplished by the motile *pseudo-vermicules* which MacCallum (l. c.) had shown to be the followers of fecundation in the *Laverania Danilevskyi*, and Koch¹⁶ has since observed the development of these *pseudo-vermicules* in *proteosoma*-containing blood within the mosquito's stomach.

Ross thus demonstrated the fact that the "gray mosquito" was not only capable of playing the part of an intermediate host of the *Proteosoma Grassii*, but further might actually transmit the infection from one bird to another. These observations have since been confirmed by Daniels¹⁷

* This mosquito was at first thought by Grassi to be identical with the *Culex pipiens*, but Giles (Journ. Trop. Med., Lond., 1899, II. 62) has recently made a careful study of the mosquitoes which Ross employed in his investigations, and finds that it is similar to, if not identical with, the *Culex fatigans* described by Wiedeman.

in India and Koch (l. c.) in experiments made with the *Culex Nemorosus* in Italy.

Simultaneously with Ross's work, Grassi's¹⁸ interesting studies in Italy revealed the fact that several varieties of mosquitoes, namely, the *anopheles claviger*, *culex penicillaris* and the *culex malarix*, were almost invariably present in malarious localities, at the malarial season. This association was so constant that Grassi was led to believe that some definite relation must exist between the presence of some or all of these mosquitoes and the prevalence of malaria. Bignami,¹⁹ in the meantime, had succeeded in producing malarial infection by exposing a patient to the bites of mosquitoes collected from malarious localities; and Grassi showed that while only members of the genus *culex* had been employed in the early unsuccessful experiments, on this latter occasion, a number of specimens of *anopheles claviger* had been present.

Grassi, Bastianelli and Bignami²⁰ then proceeded to feed specimens of *a. claviger* on infected human beings, and were soon able to demonstrate the various phases of the life of the human malarial parasites in the mosquito. Only members of the genus *anopheles* appear to serve as hosts for the human malarial parasite, but all species of this genus so far studied have proved themselves capable of harboring the organism.²¹

The Italian observers have followed the complete extra-corporeal cycle of all three species of the parasites. After entering the mosquito's stomach, flagellation and fecundation* occur, the fecundated bodies develop into *pseudo-vermicules*,† and about forty hours after feeding, there develop within the stomach walls, structures closely similar to those observed in the "gray mosquito" fed on *proteosoma*-containing blood. These undergo a similar course of development, reaching maturity in about a week, rupturing and setting free great numbers of small spindle-shaped bodies which accumulate in the salivary gland of the insect.

A sufficient number of inoculation experiments have proved that the bite of a single mosquito with infected salivary glands is capable of transmitting the disease.

* The actual process of fecundation has never been observed in the mosquito's stomach. McCallum's observation of penetration in fresh blood on the slide is as yet the only one. That it must occur, however, is fairly clear.

† That it is the *pseudo-vermicule* which enters into the stomach-wall is shown by the structure of the earliest forms of the fecundated æstivo-autumnal bodies found by Grassi, Bastianelli and Bignami, and by us in our one successful feeding experiment with the æstivo-autumnal parasite, as well as by more careful studies of the early changes occurring in the fecundated æstivo-autumnal parasites in the mosquito's stomach by Bastianelli and Bignami.^{20c}

Observations by the British West Africa expedition,²² and a few with which we have had the good fortune to make in this country, have confirmed the beautiful studies of the Italian observers.

The conditions in Baltimore appear to be essentially the same as those in Northern Italy. In the city we observe one main variety of mosquito, the *Culex pungens*,* while in the suburbs, we have found numerous examples of other culices, especially the *C. taeniorhynchus* and the *C. triseriatus*. Repeated feeding experiments with different culices upon human beings and upon birds infected with *Laverania Danilevskyi* were without result.

At Sparrows' Point, a most malarious district in the suburbs, and in a number of houses in the neighborhood, beside the ordinary culices, there were found to be great numbers of the *Anopheles quadrimaculatus* (Say). This *Anopheles*, both in the markings upon its wings, and in its gross appearance, is very similar to the *Anopheles claviger*.

In several examples of this mosquito obtained from the room of a patient suffering with malaria, there were found, in the stomach wall, characteristic encapsulated, refractive, pigment-containing bodies, corresponding in every way to the extra-corporeal stages of the tertian parasite which I have since had the pleasure of observing in Bastianelli's specimens.

In two examples of the *Anopheles quadrimaculatus*, fed upon a patient whose blood contained full-grown tertian parasites, Wooley, in our laboratory, has been able to obtain similar bodies. In one *A. quadrimaculatus* fed upon the blood of a patient containing crescentic bodies there were found in the stomach wall two lanceolate pigmented bodies, in every way corresponding to the earliest stages of the extra-corporeal phase of the æstivo-autumnal parasite.

The relation of the distribution of *Anopheles* to the prevalence of malaria has not as yet been carefully studied in this country. In Baltimore we have obtained only culices from the city proper where malaria is infrequent. From two houses on the outskirts, in each of which malaria existed, specimens of the *Anopheles quadrimaculatus* have been obtained. From Sparrows' Point and a number of houses in the neighborhood along the Eastern shore, a district in which malaria is prevalent, considerable numbers of *A. quadrimaculatus* have been obtained.

* I am much indebted to Dr. L. O. Howard and Mr. D. A. Coquillett, of the Agricultural Department in Washington, for identifying the different mosquitoes which we have found, and for many kind suggestions.

On October 28th, I was enabled, through the courtesy of Dr. Lewis, to visit the town of Jackson, Northampton County, North Carolina. This is situated in the lower Roanoke region, near an excessively malarious district. The season was late, frosts having occurred, but in the houses in that part of the town in which the most serious malaria prevailed, we found only the *anopheles*—not a single *culex*. In one of these houses thirty or forty examples of the *a. quadrimaculatus* were found. In the swamps about the Roanoke we found several specimens of the *c. posticus* and of the *c. triseriatus* and one *anopheles punctipennis*.

Two days later I visited Newport News, Virginia, where a considerable amount of malaria existed. The weather had been cold, and only in one house did I find *anopheles quadrimaculatus*. In this house, however, there were two convalescents from malarial fever.

In New Orleans, in the first week in December, great numbers of the *c. pungens* were found in the city. In the swampy malarious regions about the lake beside *c. pungens*, *c. consobrinus* and *c. fasciatus*, numerous specimens of *anopheles quadrimaculatus* and *a. crucians* (Wied.) were found; these were, for the most part, hibernating in barns and stables.

In a pool, in a stone quarry just outside of the city limits of Baltimore, Dr. Lazear discovered a breeding place of the *a. punctipennis* (Say); and numerous examples were found hibernating in the cellar of a house in a similar locality.

The malarial season, last year, was unusually mild, and our opportunities for feeding experiments were poor. So far our only positive results have been those mentioned, all three having been obtained with the *a. quadrimaculatus*. Last September, however, I had the privilege of seeing the beautiful specimens of Drs. Bastianelli and Bignami, which are entirely convincing.

The malarial parasites then possess in common with the coccidia as shown by Simon, Schaudinn, Siedlecki and others, two cycles of development. The first, taking place entirely within the human being, is asexual (*schizogonia*²³) ending in segmentation, the resultant segments, *merozoites*, penetrating new corpuscles to undergo again a similar cycle of development. After a while, however, there develop sex-ripe forms, *gametes*, which may be distinguished morphologically, especially by their staining reactions. These elements are destined to pursue another cycle of existence in the body of the mosquito (*sporogonia*). After ingestion by the mosquito the male elements, *microgametocytes*, undergo flagellation, the flagella, *microgametes*, escaping and penetrating the female elements, *macrogametes*. These fecundated elements undergo the changes

above described, developing, at first, into the motile *pseudo-vermicule* or, as Lühe²² prefers to term it, *oökinete*. This penetrates the stomach wall of the mosquito and there becomes an *oöcyst*, (*zygote*, Ross²⁴) in which there arise great numbers of *sporoblasts* (*zygotoblasts*, Ross) which, escaping from the mother cyst, change directly, without encapsulation, into *sporozooids*, which accumulate in the veneno-salivary gland of the insect, and with its bite are introduced into the new host, giving rise thus to a fresh infection. The *sporozooid* which has developed in the *oöcyst*, in the stomach wall of the mosquito, is then, the equivalent of the *merozoid* resulting from the asexual segmentation of the full-grown parasite in the circulation. Either, on entering a red corpuscle may give rise to the asexual or sexual cycles.

As a rule the first several generations after a fresh infection pursue, for the most part, the asexual cycle, sexual forms developing later. The time of appearance of the sex-ripe forms varies greatly in different cases and in different species of parasite. In some cases of tertian and ætivo-autumnal fever they appear relatively early. In quartan infections they are apparently particularly tardy in their appearance.²⁵

It may then be considered as proven.

(1) That the malarial parasites possess an extra-corporeal cycle which is completed in the stomach wall of mosquitoes of the genus *anopheles*.

(2) That members of the genus *anopheles* are capable of transmitting malaria from infected to non-infected individuals.

Is this the only method by which malaria may be acquired?

At the present moment it may be said that it is the only proven method; that from analogy with other similar diseases it is rather unlikely that there is more than one method of infection; that up to the present time this theory explains most conditions associated with malarial infection;²⁶ that reports showing the protective efficacy of mosquito nets, even in the most malarious districts, are rapidly accumulating; that there is no serious evidence in support of any other theory.

And yet, even if we accept the theory that the only manner in which malaria can be acquired is through the bites of mosquitoes, several questions arise. Experiments have as yet, failed to show any evidence of a transmission of the infectious agent from mosquitoes to their progeny.

Can the mosquito acquire the infectious agent *only* from man?

Would the mere removal of all cases of malaria from a given region eliminate all source of infection?

The evidence which we now have tends to favor an affirmative reply to these questions.

Are we then to assume that, in wild and sparsely populated tropical regions, an intermediate part must always be played by man?

This seems, at first, hard to believe. And yet, it would be rash to express oneself too positively before careful investigations have been made with this point in view. It is often surprising to find how firmly baseless impressions become fixed upon our minds.

Have we any positive proof that uninhabited, tropical, *anopheles*-containing regions, are dangerous to individuals free from infection on their arrival?

One cannot but remember, in connection with this, the statement sometimes made, that in tropical Africa, for instance, exploring parties may spend considerable periods of time in the uninhabited interior without illness, even though the regions may appear, from outward conditions, most unhealthy. It is only on returning to the sea coast, to districts where the surroundings might appear to be better, that outbreaks of malaria occur. This hitherto inexplicable fact becomes clear if we assume that in the interior, though all conditions are present for a spread of the disease, the mosquitoes are uninfected and so harmless; it is only on coming back to a settlement where malaria is endemic and the mosquitoes are infected, that the disease breaks out.

The well known history of the epidemic of malaria in Reunion Island is interesting in this conjunction. Here, in a region which, from its climate and general character might have been expected to be malarious, the disease was unknown. In 1869, in connection with an immigration from India, malaria appeared as an epidemic, and since this time has remained endemic.

Studies by Celli and Delpino,²⁸ by Grassi (l. c.), by Bastianelli and Bignami (l. c.) of epidemics in small communities, have shown that the vernal cases of malaria are almost all relapses; that during the month of June the *anopheles* begin to be active; that about a month after the beginning of the activity of the *anopheles*, the true epidemic of malaria begins, starting apparently in foci about individuals who have recently suffered from relapses of the disease. During the season in which the *anopheles* prevails the malarial epidemic flourishes only to disappear again with the disappearance of the mosquito.

There is then reason to believe that if, in any given region, (1) proper measures for treating the early relapses of malaria were adopted, and (2) efficient measures for destroying dangerous mosquitoes in their larval

stage could be carried out, the prevalence of malaria might be materially controlled.

The importance to the community of insisting upon the proper treatment of all cases of malaria cannot be too strongly emphasized. *An infected patient in a malarious district is a source of danger to those about him.*

Before we can attempt, however, to carry out intelligently measures to destroy the mosquitoes we must first, further control the important work of Ross and the Italians; we must determine definitely the dangerous species of mosquitoes in this country; we must study their distribution, their habits, their breeding places.

The valuable prophylactic hints which the recent discoveries have given us, have been well brought together and published by the Liverpool School of Tropical Medicine."

It is much to be hoped that the results of the intelligent application of such and other measures may, in the near future, demonstrate the practical value of the new knowledge which we are now gaining.

LITERATURE.

1. Manson. British Medical Journal, 1894, ii. 1306.
2. Dock. Medical News, 1890, 59.
3. Mannaberg. Die Malaraparasiten, Wien, 1893, 8vo.
4. Celli. Bull. d. Soc. Lanc. d. Roma, 1886, vi. f. i. 39. Zeri. Bull. d. R. Acc. Med. d. Roma, 1889-1890, xvi. 244. Marino. Riforma Medica, 1890, vi. 1502. Grassi and Feletti. Centralbl. f. Bakt., 1891, ix. 408, 429, 461.
5. Norton. The Johns Hopkins Hospital Bulletin, 1897, viii. 35.
6. Nott. New Orleans Medical and Surgical Journal, 1848, iv. 563.
7. King. Popular Science Monthly, New York, 1883, xxiii. 644.
8. Laveran. (a) Du paludisme et de son hématozoaire, Paris, 1891, 8vo, 147. (b) Bull. de l'acad. de méd., 1895. (c) Rev. de Hygiène, 1896, xviii.
9. Smith and Kilbourne. Investigations into the Nature, Causation and Prevention of Texas or Southern Cattle Fever. U. S. Department of Agriculture; Bureau of Animal Industry; Bull. No. 1, 8vo, Washington, 1893.
10. Bignami. Lancet, 1896, ii. 1363, 1441.
11. Manson. Lancet, 1896, i. 751, 831.
12. MacCallum. Johns Hopkins Hospital Bulletin, 1897, viii. 236.
13. Ross. (a) Proc. of the So. Indian Branch of the Brit. Med. Assoc., December 17, 1895 (original not consulted). (b) Lancet, 1896, i. 751, 831.
14. Ross. (a) British Medical Journal, 1897, ii. 1786. (b) Ibid., 1898, i. 550.
15. Manson. (a) British Medical Journal, 1898, i. 1575. Ross. (b) "Report on the Cultivation of Proteosoma Labbé in Gray Mosquitoes, 4vo, 21 pp., 9 plates, Calcutta, 1898 (Office of the Superintendent of Government Printing, India). Manson. (c) British Medical Journal, 1898, ii. 849. (d) Preliminary Report on the Infection of Birds with the Proteosoma by the Bites of Mosquitoes. Nowgong. Assam., October 11, 1898.
16. Koch. Zeitschr. f. Hyg. u. Infektionskrankh., 1899, xxxii. 1.
17. Daniels. Proc. Royal Society, March 16, 1899, vol. lxiv.
18. Grassi. Policlinico, 1898, v. M. 469.
19. Bignami. Lancet, 1898, ii. 1461. Also, Bull. d. R. Acc. Med. d. Acc. Med. d. Roma, 1898-1899, f. 1.
20. Bastianelli, Bignami and Grassi. (a) Atti. d. R. Accad. d. Lincei. cl. di sc. fis., mat. e

nat., Roma, vii., 2° Sem., Serie 5a, fasc. 11°, December 4, 1898. (b) Grassi, Bignami and Bastianelli. *Ibid.*, December 22, 1898. (c) Grassi, Bignami and Bastianelli. *Ibid.*, viii., 1° Sem., Serie 5a, Fasc. 3°, February 5, 1899. (d) Grassi, Bignami and Bastianelli. *Ibid.*, viii., 1° Sem., Serie 5a, Fasc. 9° May, 1899. (e) Grassi, *Rivista di Scienze Biologiche*. Torino, 1899, i. 481. (f) Bastianelli and Bignami. *Bull. d. R. Acc. Med. di Roma*, xxv. Fasc. iii. 1898-1899, and *Annali d'Igiene sperimentale*, 1899, ix. n. s., f. iii. 272. (g) Bastianelli and Bignami. *Ann. d'Igiene sperimentale*, 1899, ix. n. s., f. iii. 245. (h) Grassi, Bignami and Bastianelli. *Ibid.*, 258. (i) Bastianelli and Bignami. *Comunicazione fatta al X Congresso d. Soc. Ital. di Med. Int.*, Seduta del 25 Ott., 1899. (Reprint.)

21. Grassi. *Atti della R. Accad. dei Lincei. Ann.*, ccxcvi. 1899, viii. f. 12. Also, *Arch. Ital. de Biol.*, 1899, xxxii. 485.

22. *British Medical Journal*, 1899, ii. 675, 746, 869.

23. Lühe. *Centralbl. f. Bakt.*, 1900, xxvii, 436 (with full literature references to the recent work).

24. Ross. *Nature*, 1899, ix. 322.

25. (a) Koch. *Deutsch. Med. Woch.*, 1900, No. 5. (b) *Ibid.*, Nos. 17 and 18.

26. (a) Celli and Delpino. *Suppl. al Policlinico*, 1899. Also, *Centralbl. f. Bakt.* 1899, xxvi. 480. (b) Celli and Delpino. *Centralbl. f. Bakt.*, 1900, 309.

27. *Instructions for the Prevention of Malarial Fever*. (Liverpool School of Tropical Diseases.) *Memoir* (1). 8vo. Liverpool, 1899.

For further references see: (a) Celli. *La Malaria Secondo le Nuove Ricerche*, Roma, 1899, 8°, 181. (b) Marchiafava and Bignami's article on Malaria in the *Twentieth Century Practice of Medicine*. (c) The complete summaries by Nuttall which have appeared during the past two years: (1) *Centralbl. f. Bakt.*, 1899, xxvi. 140; (2) *Centralbl. f. Bakt.*, 1900, xxvii. 193, 218, 260, 328.

DISCUSSION.

DR. ALFRED STENGEL opening the discussion said that malaria like many other diseases might differ in its manifestations in different parts of the world. The study of the cases of malaria brought to the northern ports of the United States during the recent Spanish-American war were of a very different type from the same infection developed in northern cities. Some very severe cases seen by Dr. Stengel at Camp Wyckoff were of the pure tertian character. The mere statement of fact that there was fatal termination in the pure tertian infection without previous disease and without complication, in itself, evidences the point that malarial disease or the various types of malaria are different in different parts of the world and that those who study the disease here observe a type which is not to be judged entirely by the records made in Africa.

In Philadelphia two forms of malarial infection are frequent, the tertian and the estivo-autumnal. The quartan infection is very rare. Dr. Stengel had not seen or heard of such a case in Philadelphia. The estivo-autumnal is comparatively frequent but different in severity from that seen in the tropics. The clinical forms of malarial fever produced by this species of infection are varied. If the evidence of Jackson and others is to be admitted malarial fever was an intensely virulent disease in the early days of this city. The conditions then in a small town may have been different from those at the present day. Not only were there severe types of malaria, but the larval forms of malarial disease were commonly observed. Jackson called attention to malarial hemicrania and the clinical conditions sometimes referred to now as dumb ague were common then. The older physicians still refer to these forms of larval malaria very frequently.

The examination of the blood by Dr. Stengel in a considerable number of cases taken to be malarial neuralgia, malarial diseases of the eye, and malarial lethargy have never revealed to him a malarial organism in any of these cases. The malaria which he has seen develop here has been outspoken and frank febrile malaria. In one case, that of a soldier who came from Tampa there were indefinite, ill-defined preliminary symptoms, that might be spoken of as larval malaria. In that case there was mild fever—100° and 101° with vague symptoms. In a few days the characteristic malarial paroxysms developed and the organisms were found in the blood. The diagnosis of ill-defined malaria in this latitude, particularly in Philadelphia seems to be scarcely warranted.

The diagnosis made by the older writers was not based upon microscopic examination, though in Meigs' work there is some reference which suggests that he and his associates, Pepper and Rhoads, actually saw the hematozoon and described it, though they did not suspect the nature of the pigmented bodies observed by them.

The diagnosis was made largely upon the therapeutic test, and the evidence must be taken for what it is worth.

The clinical diagnosis of malaria in cases of the estivo-autumnal type scarcely needs other mention than a reference to its ordinary characteristics: the splenic conditions, irregular paroxysms, the fever and anæmia. Some have claimed that there is a peculiar odor of malarial fever. Dr. Stengel's experience is that this is as readily recognized as that of typhoid fever—that is not at all. There is undoubtedly an odor—but not a characteristic one.

The microscopic recognition of malaria is best made in fresh blood. In stained specimens the pigment degeneration in the red corpuscles may confuse the observer and lead to a diagnosis of the pigmented form of malarial organism. It must not be supposed that the malaria parasite is always to be found at the first examination or on a hasty examination. An interesting case of estivo-autumnal type occurred in Dr. Stengel's wards; after repeated examinations the parasite had not been found and was only discovered when a last and practically hopeless search had been undertaken. The ovoidal form of the estivo-autumnal organism was found and the diagnosis made certain microscopically as it had been clinically. The parasites may be present in the internal organs though not found in the blood.

Chills with elevation of temperature due to nervous causes are frequently mistaken for malaria and have been observed by Dr. Stengel. The types of malaria which exist here can only be diagnosed satisfactorily when the blood examination is made invariably a part of the clinical diagnosis. Some of the cases of so-called comatose malaria which recover after large doses of quinine, were probably not comatose malaria at all, and would have recovered without the administration of quinine. Puncture of the spleen would probably serve to make a diagnosis. It is, however, a procedure which must have certain risks. It is one which has been performed by many clini-

cians without any ill effects, but which has caused some very unfortunate accidents.

DR. F. P. HENRY said that he would not enter into the details of treatment with which every one is familiar. The opinion is universal that quinine is specific in malarial fever and the only question is: What preparation shall be used and how shall it be administered? Of the various salts of quinine the hydrochlorate is the best, but it should be borne in mind that there is a neutral and a basic hydrochlorate. These two forms of the same salt contain almost identical quantities of quinine but the neutral hydrochlorate is much the more soluble and should, therefore, always be given the preference. To repeat, the neutral quinine hydrochlorate is the best of all the quinine preparations whether for administration by the mouth, by the rectum, hypodermically, or by means of transfusion. It is better than the double hydrochlorate of quinine and used because it is equally soluble and richer in quinine.

It has been claimed that quinine is the cause of the hæmoglobinuria occasionally observed in malarial fevers. The evidence in favor of this hypothesis is very feeble. The effect of the plasmodium upon the red blood corpuscles is directly destructive. Under ordinary circumstances, and in temperate climates, the hæmolysis is not sufficient to give rise to hæmoglobinuria, but when the infection is intense or the blood corpuscles unusually vulnerable (both of which conditions are not uncommon in the tropics) hæmoglobinuria may ensue. Dr. Thayer has referred to hæmoglobinuria in the cattle disease of Texas produced by an organism that is hæmolytic in its action and this fact is corroborative of the opinion that malarial hæmoglobinuria is not caused by quinine.

No fixed rule can be formulated concerning the best method of treating malarial fevers, for while a great majority are successfully treated only by ordinary methods there are others which yield to the subcutaneous or intravenous administration of quinine.

The ordinary effect of malarial infection is fever of intermittent type but, apart from the estivo-autumnal variety in which periodicity is not a marked feature, there are numerous obscure manifestations of malaria popularly known as "dumb ague" in which certainty in diagnosis can only be acquired by the demonstration of the plasmodium in the blood. It is believed also by authorities on pneumonia that the plasmodium may be the cause of that disease. Pneumonia is often described as being malarial or intermittent, these terms being somewhat loosely employed in two senses: first, to describe the intermittent course of the fever sometimes observed in cases of pneumonia as the result of previous or coincident malarial poisoning; secondly, to distinguish certain cases in which the pneumonic symptoms are the chief expression of the malarial poison. In the first class of cases, the two infections are distinct. The diplococcus pneumoniae and the hæmatozoon malariae are not mutually exclusive and when they take root in the same organism, the influence of the latter may impart an intermittent character to the

symptoms produced by the former. In the second class of cases, there is but one infection, the malarial, and the symptoms to which it gives rise are very similar to, if not identical with, those of fibrous pneumonia. It is to the latter that the term malarial pneumonia should be restricted. The course of this form of the disease is marked by the severity of the initial chill, the rapid development of fever, pain in the side, dyspnoea, rusty sputum, crepitant râle, bronchial breathing, etc.; the equally rapid disappearance of these symptoms and their reappearance at quotidian or tertian intervals. Such facts bring the action of the malarial parasite into close analogy with that of the typhoid bacillus which, as is well known, may give rise to symptoms—the so-called “pneumo-typhus”—not to be distinguished, for a time at least, from those of ordinary lobar pneumonia. This interesting fact raises the question whether other analogies between the action of the plasmodium malarie and the typhoid bacillus may not be discovered on careful investigation. As is well known, we now recognize three forms of typhoid fever: (1) that with chief localization in the intestinal tract; (2) that with localization in lungs, kidney or brain (pneumo-typhus, reno-typhus, meningotyphus); (3) typhoid septicæmia, in which there are no distinct local lesions except such as are secondary to long continued fever.

In malarial poisoning, there are (1) the various types of intermittent fever; (2) malarial pneumonia, above mentioned; (3) malarial cachexia which may be regarded as corresponding to typhoid septicæmia. It is possible that there are other clinical manifestations of the plasmodium malarie as yet unrecognized.

DR. JUDSON DALAND said the Society was much indebted to Dr. Thayer for his interesting description of the method by which malaria is transmitted. With a study that leads so accurately and so certainly to definite results, one cannot help but feel enthusiastic. He was especially interested in the surmises made regarding the crescentic bodies. The crescentic body has been in doubt for a long time and was by many thought to be a restingform malaria, and for sometime Dr. Daland thought that the crescentic body was incorporated within the wall of the red blood cell which had actually become devitalized. He was much interested in the remarks of Dr. Stengel concerning the results obtained in the numerous examinations of blood of those suspected of malaria, and Dr. Stengel's experience confirmed that of Dr. Daland who said that scarcely once in twenty times, where this question of differential diagnosis arose, had he been able to find the plasmodium of malaria and in so far as he could study the cases subsequently, there was no reason for believing that the individual in question was affected with malaria.

In the treatment of malaria it is necessary to be careful about the form of quinine employed because of the unfavorable result from the insoluble preparation. An instance of this kind occurred in the Philadelphia Hospital, and also at one of the hospitals where quite a large number of cases of malaria existed among the troops returned from the Spanish war.

DR. D. L. EDSALL asked whether any explanation has been offered of the

fact that the anopheles seems to be the only variety of mosquito that carries malaria.

DR. W. G. SPILLER referred to a case that he had recently studied in which all the capillaries of the brain and spinal cord were filled with the malarial parasites. The patient had had the symptoms of multiple sclerosis. A few clinical cases with the symptoms of disseminated sclerosis from malaria are found in literature; but the case reported by Dr. Spiller is the only one with necropsy and microscopical examination of the tissues. The patient had been in the services of Dr. Dercum at the Philadelphia Hospital.

DR. JOHN M. SWAN asked if it is not possible that the sporozoids may remain in the venomo-salivary gland during the hibernating period and, when the mosquito resumes its activity, be inoculated into the human subject.

DR. S. SOLIS COHEN asked Dr. Thayer under what form the malarial parasites rested, during that period in which symptoms were not manifest, and where they took refuge—whether in the blood in an unrecognizable form, or in the deeper vessels or viscera where they could not be found.

Not only the relapses, cited by Dr. Thayer, but experience of many physicians with persistently recurring cases, indicated a resting form of the organism in the human body with tendency to renewed activity possibly associated with developmental changes under seasonal and climatic influences. Thus, a patient suffering with chronic malaria, what used to be termed the malarial cachexia, on removing from a malarious to a non-malarious region, might develop frank attacks of ague.

And the same thing had been observed after the administration of quinine to such a patient upon the withdrawal of the drug. While in other cases, annual or semi-annual recurrences continuing over a period of years.

One such case in Dr. Cohen's experience deserves brief record. The patient was the mother of a physician who had himself observed the facts prior to consulting Dr. Cohen. The infection had lasted for more than twenty years.

During the attacks, which occurred in July or October and continued usually for several weeks, organisms were numerous. During the quiescent interval they were not to be discovered.

For sometime after the disappearance of organisms under treatment, low hæmoglobin percentage, low count of erythrocytes and the presence of microcytes and deformed cells would be manifest.

And again, preceding the frank outbreak of ague, destruction of the cells would be indicated by similar conditions before the organisms could be found.

Under long continued administration of quinine, owing to the quiescent periods, the character of the outbreaks changed; gastrointestinal crises and neuralgic crises being substituted and organisms not being discoverable.

These finally yielded, and for two years the patient has had no recurrence of malarial symptoms.

Such a case as this, when taken into consideration with the careful, clinical observations of the older physicians, and the cases which we of to-day still meet, corresponding with the cases formerly described as larval or marked malaria, controvert Dr. Stengel's position, that in the absence of the discovery of organisms, the diagnosis of malaria cannot be made, except in cases of frank symptomatology.

It was agreed by Dr. Cohen that the diagnosis of malaria used to be made with as little justification as the diagnosis of rheumatism or grip is often made nowadays. Nevertheless, there are many cases in which the diagnosis of rheumatism or influenza is justified. So are there many cases of obscure symptomatology in which careful study, exclusive of other diagnoses, and positive facts in the history or clinical course of the case, warrant the diagnosis of malaria, despite failure by competent microscopists to discover malarial organisms in the blood.

DR. D. LONGAKER said he had recently under his care a man aged about fifty years who had a distinct attack of tertian malaria. About two weeks ago Dr. Longaker saw this patient in a relapse. The original attack occurred last August. The disease was apparently contracted on the banks of the Delaware in New Jersey. About a week or ten days after the outbreak of the disease, the four-year-old grandson of this man developed a distinct tertian malaria. The relation of the two cases was very interesting. The man has lived all his lifetime on the river front and never before had an attack of this kind. The feature of particular interest is the coincidence of the disease in two members of the same family. The relative absence of mosquitoes at this season suggested to Dr. Longaker that there might be other agents of transfer of the malaria parasite.

DR. W. S. THAYER, closing the discussion, said that the form in which the parasites remain in the human body in those cases where relapses occur after long intervals is unknown. That they may remain inactive throughout considerable periods of time there is no doubt.

With regard to masked malaria: There occur in malarious districts, not so very infrequently, cases in which the patient has an occasional chill at irregular intervals, at which times he may or may not take quinine, where on a number of ordinary clinical examinations of the blood, made after such paroxysms, no parasites may be found. In these cases there is, probably, after each paroxysm, an attempt, if one may say so, at spontaneous recovery. In other words, so great a part of the group of parasites is destroyed at each period of sporulation that it takes a considerable length of time for the few remaining to reach a number sufficient to produce clinical symptoms. And for days, and perhaps weeks, after each paroxysm, parasites may be missed in ordinary blood examinations.

There are also cases of mild malaria in which the patients may show no definite sharp paroxysms. Daily, or on alternate days, or at more or less irregular intervals, the patient may have an abortive paroxysm with headache, general malaise and symptoms associated with a slight rise of tem-

perature, and yet he may never realize that he has had a distinct malarial paroxysm. In such cases an anæmia with splenic enlargement may gradually develop, and a greater or less degree of cachexia may be attained. In such cases a careful examination of the blood will show a few malarial parasites. Cases of definite malarial fever in which parasites cannot be found on any one careful search are unusual, and now that one can easily apply Romanovsky's stain, those cases will probably be still fewer.

There are undoubted cases of facial neuralgia which are benefited by quinine. He has never seen a case of facial neuralgia, however, due to malarial infection.

With regard to hæmoglobinuria he agreed with Dr. Henry, that while hæmoglobinuria in instances of malarial fever, or malarial cachexia, precipitated by quinine, undoubtedly does occur in some districts, yet its frequency is probably much less than is at present generally supposed.

The value of the hypodermic use of quinine in serious cases, or where immediate action is desired, is unquestionable; if the injections are made sufficiently deeply and with antiseptic precaution, there is probably never trouble. If, however, the injection is made too superficially, he has observed serious sloughing.

He knew of one instance in which death from hemorrhage occurred as a result of aspiration of the spleen, and he has always felt that this means of diagnosis should be used with very great care.

In his experience the intravenous administration of quinine, according to the method of Baccelli, has been followed by good results.

He did not wish to be understood to say that a blood examination is absolutely necessary for the recognition of any case of malarial fever. The value of the examination of the blood is much like that of the examination of the sputa in pulmonary tuberculosis. There are, of course, many instances of malarial fever in which the diagnosis is self-evident, as is the case in pulmonary tuberculosis. And yet most careful observers would insist upon the finding of the malarial parasite in these cases just as they would upon the demonstration of the tubercle bacillus in the sputum to confirm a diagnosis of tuberculosis.

Report and Exhibition of a Fibro-cyst of the Abdominal Wall.

BY LEVI J. HAMMOND, M.D.

[Reported and exhibited May 23, 1900.]

This specimen is exhibited more on account of the difficulty attending the diagnosis of its location than from any peculiar interest attached to the specimen. It was removed yesterday from a woman, fifty-five years of age, who was supposed to be suffering from a broad-ligament cyst. This diagnosis had been made by two physicians before I saw her.

When the median incision was made through the skin and fasciæ, the mass was easily seen to be within the abdominal wall and to be extraperitoneal. All the abdominal layers from the fascia of the external oblique to the peritoneum adhered both to each other and to the fibrocystic mass by an inflammatory exudate. The mass probably originated within the transversalis or between it and the peritoneum, near the pelvic junction. Although extraperitoneal, the tumor bulged into the abdominal cavity so that it appeared, either by bimanual palpation or by vaginal examination alone, to be a left broad-ligament growth. Its presence was first observed by the patient during last September; in the nine months that have elapsed it has grown to its present size—that of a child's head.

The origin of the growth and its pendent position over the left pelvic region, invited a mistake in diagnosis, and suggested that the mass was within the peritoneum.

Demonstration of Kromskopic Lantern-slides Prepared from Fresh Specimens, and Exhibition of Some Pathological Specimens Preserved by Kaiserling's Method.

BY HENRY W. CATTELL, M.D.

[Exhibited and reported May 28, 1900.]

As is well known, many methods have been proposed by means of which permanent records of the appearance of fresh tissues may be preserved for future use. It was thought at one time that lithography and the wax model had solved this question, and we had in the fifties most excellent examples of this method of showing the natural appearance of the various parts of the body. No one can examine Lebert's atlas without questioning whether we have really advanced much in the way of illustrating our medical works, or see the models of Ziegler, Talrich, and Tramond, which are to be found in most of our museums, without admiring their natural appearance. The well-known imitations of flowers in colored glass by the Blaschkis, father and son, at Harvard University, are excellent examples of the artificial reproduction of the natural colors of flowering plants.

I have lately employed a method for the preservation of the natural colors of pathological specimens which has given excellent results. A stereo-kromskopic picture is taken of the morbid specimen. In taking the pictures, orthochromatic or isochromatic plates should be

employed. A photograph of the spectrum should be made, to see if the true color values are reproduced. Next, pictures are taken for half-tone reproduction through the three screens. Excellent results may be obtained by the use of a pyrocatechin, metol, or tolidol developer; hydroquinone should not be employed.

Pieces of tissue are then cut off for microscopic study, and the specimen is preserved by some method which will best show the natural colors of the part. This is done by the use of Kaiserling's method, which is as follows:

The specimen is placed in the position which it is to have permanently. This can readily be accomplished by proper stuffing with cotton and the use of wires and small sticks. The specimen is then laid on cotton in a jar composed of formalin, 500 to 750 c.cm.; potassium nitrite, 10 grammes; potassium acetate, 30 grammes; water, 1000 c.cm.

The specimen remains in this fluid during a period of twenty-four hours, when it should be examined to see if it is thoroughly hardened; if not, it should remain in the jar until the hardening is complete. The preparation is then transferred to 80 per cent. alcohol for twelve hours and to 95 per cent. alcohol for two hours. The color will be promptly restored after the specimen has been placed in the alcohol. The preparation is subsequently preserved in a fluid composed of equal parts of glycerin and water, to every 1000 parts of which 30 parts by weight of potassium acetate have been added. The jars containing specimens should be kept in the dark, as sunlight causes a deterioration of their colors.

The kromskop with the kromogram is then sent to the photographic engraver. If it be thought necessary, the specimen may also be sent for comparison. In preparing the half-tones reference to the kromskopic picture should be made whenever any doubt arises. The same method is employed with the printer. He is informed that the colors must be identical with those of the kromskop, or, if any change is to be made, the required alteration can readily and specifically be indicated. If a colored drawing is to be prepared by an artist, he has before him the specimen, preserved by Kaiserling's method, showing the shape of the object, and by reference to the kromskop he can secure the proper color values.

[Dr. Cattell showed a number of stereo-kromskopic lantern-slides and specimens preserved in Kaiserling's fluid.]

Laboratory and Percentage Feeding of Infants in Health and Disease.

[*Abstract.*]

BY J. P. CROZER GRIFFITH, M.D.

[Read May 28, 1900.]

Those who have accustomed themselves to percentage feeding will never wish to employ any other method. Yet misconceptions arise among those ignorant of the proceeding regarding the real nature of it. A contrast of the old and the new methods may tend to do away with these.

In the old way physicians made empirical mixtures of certain numbers of ounces of cream, milk, water, and so on, without any accurate knowledge of just what the final result consisted in or without knowing the reasons for the changes made. In fact, much further progress was impossible, owing to the variability in the strength and purity of the milk and cream employed.

All we could do was to shift numbers of tablespoonfuls up and down as the needs of the child seemed to demand.

With the newer plan physicians simply adopt the percentage analyses of milk and cream which have been furnished by investigators, and apply these to practical feeding. By this method they do their thinking and make their calculations in the elemental percentages of the ingredients—that is to say, mixtures are now composed of this or that *percentage* of fat, proteids, etc., instead of so many *tablespoonfuls* of milk and cream and water. This method is more scientific, and the results more satisfactory. The calculations are simple, and several easy formulæ have already been published.

But to work in percentage feeding it is necessary to have milk and cream of a definite percentage strength. We may assume that the sugar and proteid of ordinary herd milk varies but little. It is the percentage of fat which is the variable quantity. Any physician can, however, readily test the fat strength with the simple centrifuge sold for general medical purposes, and can then calculate his mixture accordingly. When cream and milk of a definite strength in fat can be obtained, even the simple home testing is obviated.

This brings us to a consideration of milk of certified strength, as furnished by several different dairies in this country, and especially to the question of milk laboratories as managed by the Walker-Gordon

Company in various cities. The purpose of a milk laboratory is not always understood. It is merely a place where you can order anything you want in the way of food for an infant—even proprietary foods if you wish them. To speak of a baby being fed on “Walker-Gordon milk” shows misconception. There is nothing special about this milk, except that its strength in fat and proteid is guaranteed, and that especial care is taken for its purity. You may mix it up in any way you please, just as with any other milk. The Walker-Gordon milk and cream may be purchased and the mixture made at home according to the directions given by the physician.

But even by this method the calculation of a formula by the physician is necessary, and the mother has a lot of work to do. With a milk laboratory handy, all this trouble can be avoided by having the mixtures made at the laboratory according to prescriptions furnished by the physician. In this case he merely specifies in the prescription the desired percentages of fat, proteid and sugar wanted, the number of bottles for twenty-four hours and the amount in each, and so on. Anything whatever that is desired may be prescribed—barley water, egg water, pancreatin, etc.

There has been some little talked and written against milk laboratories on account of the use of “separator” products. But all dairy cream nowadays is separator cream. The objection therefore is trivial.

Finally it is necessary in laboratory feeding, as in all feeding, to know what to expect from the different ingredients, and what proportions are likely to be required. As a rule, every very young infant, and older ones with feeble digestion, should be started with low percentages; say 0.50 or 0.66 of proteid instead of the normal 1 or 1.50 of human milk, and with the fat and possibly the sugar as well lower than normal. This is because we are dealing with a milk other than human. If curds are passed in large quantities the proteids are probably too high. If there is much rancid vomiting the fat is probably in excess. The low percentages are to be increased as soon as possible; but there should be absolutely no fixed rule about a positive increasing of percentage strength to keep pace with increase in the months of life. No such increase occurs in human milk. The proper gain in body weight should be the chief guide. I may say in passing that I have never found the slightest difficulty in increasing a proteid percentage with laboratory milk more than with any other milk, as has been claimed by some physicians. I cannot conceive of any reason for such a difficulty, nor do I believe that it exists. It is merely necessary that we increase

the percentages of the ingredients in the proper way, when the need for increase comes.

(The details of three cases were then given, with wall charts, illustrating this point. Each child had been fed previously more or less on laboratory prescription milk. Each was in wretched condition when seen. Each gained in an entirely satisfactory way after the proper percentages had been found. The fact was emphasized that a hasty judgment would have condemned laboratory feeding in these cases. Yet it was not the laboratory feeding but the physician's prescriptions which had been at fault.)

DISCUSSION.

DR. THOMPSON S. WESTCOTT said he first wished to register a protest against the popular disinclination manifested by the profession at large to resort to mathematical calculations. It is a rather common idea that percentage feeding involves too much mathematics for ordinary use; and yet, mathematics is a process which enters into our daily work constantly; no one writes a prescription without making use to some degree of mathematical processes. A little investigation will show that the mathematical work required for the calculation of a percentage formula should not be a severe tax upon the intellect of any member of what we are pleased to term a learned profession. Possibly this statement might be made plainer by mentioning an aspect of the subject which was not directly alluded to by Dr. Griffith; namely, the calculation of percentage formulæ. Dr. Westcott trusted that he would be pardoned for trying to show upon the board the relation between actual quantities of milk and cream and the percentage expression of the same mixture. (Illustrated and explained on the board.) The reason for the disagreement of milk-mixtures can be brought down to rather a definite point: it depends largely upon the digestion of proteids, as Dr. Griffith pointed out. If the analysis of human milk and cow's milk is recalled, a reason for this fact will be suggested. Any ordinary dilution of cow's milk contains a considerable excess of casein as compared with the proportion of this element found in human milk. Each infant seems to have a certain power of digestion which enables it to assimilate not more than a certain definite proportion of casein in the milk-mixture. When a greater proportion is presented indigestion occurs and yields only when the proteid percentage is reduced.

If the baby is weighed twice a week some interesting observations may be made, from which important clinical data can be obtained. A child with delicate digestion may gain rapidly for three or four days, and then in the next three or four days gain nothing. The increase in proteids, as Dr. Griffith has indicated, should usually be made slowly. Dr. Westcott's experience gave him no occasion to prefer laboratory to home modification.

Possibly he had been fortunate in meeting mothers who would give the requisite thought and care to the preparation of the milk.

DR. ALFRED HAND, JR., said that the paper illustrated the need of a better understanding on the part of the general practitioner, under whose care most infants come, of the fundamental principles of infant feeding. The percentage method furnishes a good means for putting these principles into force. This may be used either in the laboratory or at home, but with greater accuracy in the former. Some physicians have obtained better results with home modification and have found the children able to digest higher percentages of proteids than Dr. Griffith has advocated. In explanation of this, it has been said that the laboratory mixture, being made up of separated cream, in which the emulsion is destroyed, and skimmed milk, is difficult to digest; also, the use of barley water in home modification as a diluent is said to favor the formation of smaller and more easily digestible curds. For infants below normal, it is sometimes necessary to predigest the mixtures containing higher percentages of proteids; the objection has been urged that, when predigestion is once begun, it must be kept up for a long time, but Dr. Hand had not found this to be the case in his experience.

DR. C. F. NASSAU said his practice had little to do with babies, but he warmly recommended the Walker-Gordon milk-mixtures. He had an infant and it had had five different kinds of food and when three months old it weighed a pound and a half less than when it was born. At the laboratory he obtained a mixture and at the end of a year the child weighed 23 pounds and a little over. It has never been ill from the day it began using modified milk.

DR. W. R. WILSON said that he did not mean to oppose the scientific suggestions in the question of feeding by the percentage method, but he wished to emphasize the practical side of the question, namely: the methodical care of the infant and the proper attention to its surroundings, without which, dietary measures are often unsuccessful. He stated that it had been his experience frequently in the care of infants of primiparous women, even in the better classes of society, to find the grossest ignorance.

Upon this point he further remarked upon the difficulty of impressing nurses who are otherwise well trained with the necessity in regularity in feeding, and exact methods in preparing the food.

He stated that the obstetrician was often to blame for mistakes in the early feeding, because of his unwillingness to take the infant from the breast promptly when it has become evident that the breast milk disagrees with the infant. He has often found it necessary to substitute artificial feeding for the breast within the first two days of the infant's life.

DR. D. LONGAKER said that remembering sick children require low proteids, and that all babies that start on percentage feeding require low proteids, he believed the average child will bear an increase of proteids more rapidly than is taught and that they will require a more rapid increase in order to maintain the regular weight-gain and a perfect digestion. In con-

clusion he expressed his disapproval of proprietary foods. They are usually harmful and the method in which they are exploited to the public is most objectionable.

DR. J. M. SWAN asked Dr. Griffith to give information about the use of lime water in infant feeding. In the children's dispensary in the Presbyterian Hospital it has been Dr. Swan's custom to use lime water as a diluent rather than barley water, and always with excellent results.

DR. GRIFFITH in closing the discussion said that lime water is employed merely to make the mixture naturally alkaline. It is no longer viewed as a means of adding to the mineral matter of the mixture for the sake of any nutritive value this would have. Barley water is objected to by some, while it is favored by others on the ground that it mechanically makes the casein of the milk more easily digestible. In reply to another question he said that low proteids are the safest to begin with. It is a good plan to watch the weight of the child and to give the percentage of proteids which this shows to be necessary.

With reference to percentage feeding in general, he was certain many physicians would be disposed to say "this is too difficult for us;" others, "it is too much trouble," others "our results are good enough as they are." All this is wrong. It is true that healthy babies have a wonderful tolerance of our crude methods of work. It is, however, in the difficult cases of feeding that the absolute accuracy is required, and will show its superiority. The only reason that the cases reported did well was because there were definite principles to work on, definitely and accurately carried out. The histories showed what differences very slight and apparently trivial alterations in the mixtures made in the health of the children.

The success does not depend so much upon the use of brains as upon care. We have no right as physicians, to whom lives are entrusted, to mind trouble or not to acquaint ourselves with improved methods because they are thought to be difficult. If the results are better by careful percentage feeding, it is one's duty to employ it. As a matter of fact it is not at all difficult to accustom one's self to think and work in percentages and not in quantities.

The Use of Adrenal Extract in Hay Fever.

BY LEWIS S. SOMERS, M.D.

[Read May 23, 1900.]

Following the announcement by Bates,¹ that the aqueous extract of the suprarenal gland possessed remarkable power as a local hæmostatic and astringent in ophthalmic practice, numerous investigators studied

¹ New York Medical Journal, May 16, 1896.

the action of the drug both clinically and experimentally and found that it possessed marked constricting action upon mucous surfaces and especially upon that of the upper respiratory tract. When applied locally to the normal or inflamed mucous membrane of the nasal interior, the tissues become ischæmic and contracted and the engorged vessels are relieved by the action of the drug in expressing the blood from the parts.

When used intravenously, the physiological action is expressed by an elevation of blood-pressure; the present trend of opinion being that this is a direct action upon the peripheral vessels, corresponding therefore to the results obtained from its local application to mucous surfaces. But two facts of major import must be noted when the gland is used in this manner, the first being that the rise of blood-pressure is rapid, evanescent and as promptly falls again; while in the second place, dangerous cardiac symptoms are also produced, practically prohibiting its use by this method, except for experimental purposes in the lower animals.

From a study of the physiological action of the adrenal and from the favorable results obtained in a few cases of Addison's disease, it was but a step to the apparent indications for its administration both locally and internally, in the neuro-vascular complex of hay fever. S. Solis-Cohen¹ found that the symptoms of hay fever from which he suffered, were controlled by using a five-grain tablet of suprarenal substance by the mouth, every two, three, or four hours, according to the results obtained. He also found that the associated coryza or sneezing would cease within fifteen minutes after taking the tablet and that these favorable results were more apparent when the drug was allowed to dissolve on the tongue, than when it was immediately swallowed. Similar reports have been made by Douglas² and Bates,³ the former considering suprarenal extract internally, as almost a specific in hay fever. While Bates states that the disease has been completely relieved by taking the extract at intervals of two to four hours.

My experience with the internal administration of suprarenal extract in hay fever comprises the study of twenty-one patients; nineteen males and two females; the youngest being seventeen and oldest fifty-six years. The time during which the patients received the adrenal exclusively, varied from one to six weeks, ten being obliged to discontinue the tablets, after a week's trial, on account of disagreeable symptoms,

¹ Philadelphia Medical Journal, August 13, 1898.

² New York Medical Journal, September 2, 1899.

³ New York Academy of Medicine, Section of Laryngology, December 27, 1899.

while seven used them continuously for six weeks and in four it was administered at irregular intervals, but at least one tablet daily from two to three weeks.

The drug may be used either in the form of five-grain tablets or in a glycerine solution, the former being the most preferable as it does not produce the same degree of nausea as does the solution. I used the latter at first, but for the reason just given and the unreliability as regards accurate dosage, it soon became apparent that the tablets were superior, so they were thereafter used exclusively. The dosage practically followed out that previously mentioned, all cases commencing on one five-grain tablet every two hours and in those in which this produced unpleasant symptoms, it was given in the same amount every four hours. From fifteen to seventy-five grains being taken daily, the latter being given to two patients, without however the production of any untoward symptoms or any appreciable benefit to the hay fever.

Without going into details of history in all the cases, three may be taken as types, especially of the violence and duration of the affection :

CASE I. J. S., a retired business man, aged fifty-six years. Had suffered from hay fever for twenty years; the disease usually appearing the first week in June and continuing until the first frost in the fall. For the past five years, asthma at night or at any time during the day on the approach of a thunder storm, has appeared and during the past two years the nocturnal paroxysms of asthma have become so severe that he is obliged to sit at an open window, grasping the back of a chair, in order to obtain air. There were no gross structural abnormalities of the upper respiratory tract and the urine was normal. Various measures had been used both to abort the attack and diminish its intensity, but were without effect when I first saw him, six weeks after the onset of the affection. He was given five grains of the suprarenal gland every two hours for six weeks, except for a few days at the end of the second week when he refused to take the drug on account of a marked increase in the chest constriction and augmentation of the asthma. He was persuaded to again use the tablet, but finally ceased entirely on account of the asthmatic symptoms.

CASE II. was that of a bookkeeper, aged forty-eight years. The adrenal was given in the same way, three weeks before the expected attack, which was delayed two weeks, it then however made its appearance the same as usual. The disease was of four years' duration and the asthma from which he suffered had appeared for the first time during the previous season. As a result of the use of adrenal, the hay fever symptoms were in no way changed, the asthma developed

earlier than usual, was more severe and its intensity greatly diminished when the suprarenal was withdrawn.

CASE III. was that of a boy of seventeen years, and had existed for three years with mild nocturnal asthmatic wheezing dating from the first attack of the hay fever. The drug was commenced a few days before the expected attack, which appeared at the usual time and continued until he went to the sea shore, when it entirely disappeared. The effect of the adrenal was to slightly diminish the palate and chin pruritus but was indifferent as regarded the other symptoms, the results obtained not being sufficient to warrant the further use of the drug after six weeks' trial.

Without going into the history of the other cases the effects of the drug may be studied as regards its influence upon individual symptoms. The nasal symptoms, such as sneezing, rhinorrhœa, and obstruction to breathing were but slightly influenced; sneezing attacks were apparently more infrequent while the drug was being used, but the attack in itself was as severe as before. The nasal stenosis was more favorably influenced; in about one-half of the cases in which the obstruction was marked, there was diminution in the size of the engorged turbinals; while the rhinorrhœa was uninfluenced in any way. The chin and buccal pruritus were diminished in intensity when the tablets were allowed to dissolve in the mouth, but when they were immediately swallowed no changes were observed. The same being the case with the eye symptoms, in no instance were they favorably influenced.

A feature of considerable importance was the effect of the drug upon the asthmatic symptoms in the six cases suffering from this feature of the disease. In all these cases that had asthma for two to seven years previously, but in whom it had never appeared but at the height of the hay fever season, the influence was unfavorable. The paroxysms being more frequent and of greater intensity when the adrenal was being taken indicated that the gland bore some causal relation. In support of this, it was withdrawn for varying periods of time with a corresponding relief and when again administered, the unpleasant features would become evident. Another aspect of its effect, was that in five cases in which asthma had at no time previously existed, it appeared while the drug was being used, in all however in a mild form and also disappeared not to return, when the suprarenal was withdrawn. Possibly the appearance of the dyspnœa was a coincidence, but both the patients and myself were convinced that it was the direct result of the drug.

The gland was given in two ways, by dissolving a tablet on the tongue and by immediately swallowing it. The former being the most satisfactory, as the physiological action in some cases was to a slight extent produced in this manner, while when it was swallowed, little or no appreciable results were obtained; the drug, as regards its effects upon the hay fever, being practically inert, this, although clinically opposed to its administration in other affections, is supported by experiments in the lower animals and to a still less extent in man. The majority of experimenters claiming that the active physiological effects of the gland are not seen when it is given by the mouth.¹ Its effect upon the mucosa of the upper respiratory tract is practically *nil* when so administered, but when it is allowed to dissolve in the mouth, a slight action is observed, its beneficial action upon the palate pruritus being the direct result of its local use and not of its internal administration.

The untoward or rather disagreeable effects produced, were nausea, a sense of chest constriction, and the development of asthma or the augmentation of the paroxysm when it already existed. The nausea was but slight and of little moment, rapidly disappearing within a short time and was not produced by an excessive dosage, as it was as frequent in those taking five, as in those taking from thirty to fifty grains daily. The sense of chest constriction was observed only in those with pre-existing asthma or in those who developed it while under observation. It preceded the frank asthmatic attack by from four to seven days and disappeared within a few hours after the drug was withdrawn.

The favorable results obtained as seen in these cases, were not of sufficient magnitude to recommend its use for this purpose, as it must be apparent that when administered by the stomach its effects are practically *nil*, but some absorption does undoubtedly take place as shown by the unfavorable symptoms. A portion of each lot of tablets administered was used in aqueous solution to determine its local effects, so that while this report does not agree with the results obtained by the observers previously mentioned, the inutility of the drug was not the result of inert specimens, as its active local effects occurred promptly in all the cases. It was also administered in conjunction with other measures after being used alone, but no special beneficial effects ascribed to the adrenal could be observed. From the small number of cases here recorded, no sweeping conclusions can be formulated, but an

unfavorable conclusion of necessity, can only be drawn and I would not therefore recommend a long trial of the internal use of the drug in hay fever.

In conclusion, a few words are necessary as to its local value in this disease; here it is of great service and when applied to the mucosa of the nose and pharynx, we can depend upon restoring the nasal respiration, diminish secretion and sneezing attacks and practically make the patient comfortable as long as the applications are continued. Internally, therefore, I consider the suprarenal gland of little or no use in the treatment of hay fever, either with or without conjoined treatment, but locally in conjunction with measures suited to the individual case, I believe it to be the most satisfactory single remedy that we at present possess.

DISCUSSION.

DR. J. A. SCOTT said that anyone who has had hay fever looks forward to a specific with a considerable amount of pleasure. No one can expect to secure a specific for that fever until the basis of the disease is known. Many of the nasal specialists agree that it is a neurosis, and some of those who have hay fever may not be, at least in their opinion, neurotic. The story of the woman who upon having an artificial rose put to her nose developed rose cold, is proof to many minds that the disease is a neurosis. There is no proof, however, that all cases of hay fever are neurotic in origin. The rheumatic or gouty tendency has much to do with the development of hay fever in adults; this is probably so in children, also.

DR. S. SOLIS COHEN expressed his interest in Dr. Somers' paper, and in all such careful studies. There is no question that each case of hay fever, like each case of malnutrition in children is a study in itself. Dr. Cohen having been the first to use adrenal substance in the treatment of hay fever and in his own person, with good result, he had published his experience in order that others might experiment upon themselves or upon their patients. While Dr. Somers' patients had not been benefited, those of Dr. Douglas and others had been completely relieved—and Dr. Cohen felt that his work had thus not been wasted. The preparations of suprarenal gland on the market differ much in their activity. Different manufacturers differ in their method of preparation and the products of the same manufacturer are sometimes inconsistent.

Experimental work upon lower animals shows little absorption of the active agent of the adrenal gland substance from the alimentary tract—or its neutralization—so that the cardio-vascular effects from internal administration are undemonstrable. Nevertheless careful observations upon human beings show that there is absorption of something when suprarenal extract is administered. Upon the normal pulse and normal heart no results can

be demonstrated, but upon the abnormal pulse and the abnormal heart there is a distinct effect; moreover control of coryza and itching has not only been observed by Dr. Cohen and others but he has pleasantly experienced it, so that absorption in some individuals at least, seems to be demonstrated. There is no doubt that absorption of solid preparations takes place more rapidly from the tongue or mouth, than from the gastric mucous membrane. The heart may be influenced by a drop of solution placed in the conjunctival sac. By placing powder or tablet upon the tongue and allowing it there to be dissolved and absorbed the effect is much quicker than when the drug is swallowed. With glycerin extract, absorption takes place in the stomach, but nausea is easily produced. In a great number of the commercial preparations there are decomposable animal substances in the tablet, and if too much is given a fetid diarrhoea is developed.

While adrenal substance is more active locally than internally and, if a patient will take the trouble, the local method is to be preferred as in Dr. Somers' case, yet from his personal experience both last year and the year before Dr. Cohen knows that in one case, at least, adrenal extract taken internally controlled the hay fever symptoms. He added that this was in the city of Philadelphia, because it makes a difference whether a patient is in the city or in the country among the grasses and vegetation. As to the region of Pocono, that is about the last place on this earth for a hay fever patient in his "season" to go—or at all events to stay—if he gets there inadvertently.

Hay fever has been clearly shown to be dependent upon two conditions: first, a vaso-neurotic constitution in the patient, and second, an exciting cause, differing with individuals and classes of individuals—some irritant which affects the mucosa of the upper air passages and of the eyes. The rheumatic or gouty diathesis is sometimes associated with this vaso-neurotic constitution. Nasal abnormalities are merely coincident. When present they aggravate the discomfort and relief is given by their correction. In his own case, and in many others that he had examined the nose was normal.

Dr. Cohen now prescribed adrenal substance both locally and internally for his hay fever patients and about eight or nine in ten were kept comfortable by it. Of course general hygiene, nasal cleanliness, etc., were not neglected.

DR. L. J. LAUTENBACH said that it would be a matter of interest when reporting these remedies, especially animal extracts, to state the manufacturer's name. The results of Bates and Cohen were altogether favorable and the results reported at this meeting were very variable. This conflict might be due to the preparation used. Conflicting reports had appeared concerning dioxide of hydrogen, because the preparations were so different. The same trouble exists to-day in using liquid preparations of ergot.

Each year, Dr. Lautenbach is more convinced that in addition to a sus-

ceptible nervous organization there is invariably some nasal lesion responsible in cases of hay fever.

DR. SOMERS in closing the discussion said he used the same form of adrenal gland as used by Dr. Cohen. He got better results with carbolic acid internally, than with any other single remedy, but it was his habit to treat each case as an individual, treating the patient and not the hay fever. He believes the bad results from the extract are due to the large amount of animal matter present.

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**Report and Exhibition of a Case of Fracture through the
Rami of the Lower Jaw.**

BY M. B. MILLER, M.D.

[Reported and Exhibited, September 26, 1900.]

The case is interesting because somewhat unique, involving both rami, and because of the ideal reduction obtained. The man broke his jaw—I do not know by what means—on September 17th. I saw him on the 18th at the Polyclinic and found that he had a fracture at the angle of the jaw on the right side, the fracture being probably comminuted, while on the left side, the fracture was one-half an inch above the angle of the jaw. The jaw was dropped and twisted to the right. It was impossible by such efforts as I was able to make to bring the jaw into apposition. Dr. Schamberg first attempted to bring the jaw into good position by means of an interdental splint. Failing in that, he applied the dressing which he will describe. The entire absence of pain is I think very striking.

DISCUSSION.

DR. M. I. SCHAMBERG said that the patient presented by Dr. Miller was seen by Dr. Schamberg three days after the injury. There was comminution upon the right side at the angle and a clean cut fracture upon the left side about one-half inch above the angle. The anterior portion, or body of the lower jaw, was considerably displaced backward and downward pointing anteriorly, somewhat to the left side. As interdental splints are not effectual in properly maintaining reduction in fractures at the angle or in the ramus, he decided to band the upper cuspid teeth and lower bicuspid, and by means of small rings soldered to the bands and wire ligatures passed

through the rings bring the upper and lower jaws into their proper relation. This is designated the "Angle Method," after Dr. Edward H. Angle who first described this ingenious manner of treating fractures of the jaws. The result is almost perfect if the fracture is properly reduced. In the case exhibited, reduction was accomplished by making forward traction by means of a silk ligature passed around the lower anterior teeth, while lateral pressure was exerted upon the prominent fragments on either side and upward force applied to the chin.

By the use of this method one does away with cumbersome appliances and bandages; the patient more readily maintains a hygienic condition of the mouth and liquid nourishment is easily taken.

Imperforate Hymen with an Interesting History.

BY M. J. KARPELES, M.D.

[Read September 26, 1900.]

The subject of this report is M. W. Her age is fifteen years, she is sparsely developed, and her weight ninety-two pounds.

On the night of April 24th, I was first sent for and the history was given me that the patient had not passed urine for thirty-six hours and was suffering much abdominal pain. She gave a history of having been well till four years ago. At that time she had a severe attack of grippe lasting two weeks; immediately following this, she had acute muscular rheumatism lasting ten weeks; toward the end of this period she became dropsical. She was unable to attend school for one year, during a part of which she had epistaxis daily. On account of heart disease she was then under the care of a physician, and exhibited the characteristic symptoms of that affection.

The present trouble apparently began January 16th of the present year. The patient was unable to lie down owing to abdominal cramps. She walked the floor both day and night, being restless and melancholy. She was at this time under treatment at a dispensary near by. Toward the end of January she began to feel somewhat better, yet, the pain in the hypogastric region never entirely abated. This pain became very severe at intervals, being worse toward the end of each month. It was especially severe on April 20th and on the 21st, which was three days before I first saw her.

Upon learning the foregoing history I examined the patient's abdomen and found it very much distended, my efforts were turned toward relieving her bladder which I was led to believe to be distended from the history given of retention. I ordered a hot sitz-bath, hot applications

to the abdomen, and hot drinks; instructions being given that if she did not pass urine within four hours, report was to be made to me. However, that night she passed considerable urine. Examination of a specimen of it showed an excess of urates. From the history of continual pain and interference in micturition I went to the patient's house next morning expecting to make an examination of the bladder for the possible presence of calculi. On exposing the patient the trouble was at once revealed.

The labia were widely separated owing to the protuberance from the vagina of a large hemispherical mass. Dr. J. C. Knipe was called to see the case with me and we decided that the patient should first be catheterized which was accomplished after some difficulty owing to an abnormal elongation and lateral deviation of the urethra. Only a few drachms of urine were obtained. The abdominal enlargement remained the same.

A crucial incision was then made and at least two pints of dark menstrual fluid escaped. On examining the hymen it was found to be approximately 2 mm. in thickness and the quantity of fluid so distended the vagina that the cervix could not be reached by palpation.

The patient was immediately relieved from all pain. For two days her temperature was 99° F. She has menstruated regularly since and she has been quite well excepting an attack from aortic insufficiency, which detained her in bed for several weeks.

This case I think is interesting owing to the large quantity of menstrual fluid apparently retained during a long time and because, in spite of the forcible pressure exerted, the hymen remained intact by virtue of its thickness. The case is also instructive: first, from the fact that a diagnosis of ascites was made because of the existence of cardiac insufficiency; and second, because of its further complication by a history of retention of urine. These mistakes could have been avoided by a vaginal examination.

Delayed Operations in Appendicitis.

BY JOSEPH PRICE, M.D.

[Read September 26, 1900.]

If we ever succeed in educating the general practitioner to the importance of early surgical interference in appendicitis, we will cease to discuss the subject under so many headings, *e. g.*—"Catarrhal," "Relapsing," "Perforating" or "Fulminating Appendicitis."

Some good practitioners always seek early surgical interference and their operations are always done in the acute or early stages of the disease. They rarely wait for an interval operation or for the second or third attack and ill health, they have confidence in their diagnostic ability and they are never in error. Recently, a physician of this class had his patient on my operating-table one hour after seeing him in the office, and three hours after the boy left his work in pain. This physician rarely loses a patient.

Another, the "conservative" man, I am sorry to say, a very common class of physicians, hesitates from first to last. He is always in *doubt* about his diagnosis. His doubt commonly ends in disaster. He rarely urges operative interference until it is too late. He has confidence in remedies and can cure with drugs. He condemns surgical interference in unqualified language. He says if he loses a patient it hurts his "business." The unfortunate patient commonly employs two or three physicians before the precise nature of the trouble is recognized. A consultation follows and the patient is placed in a surgeon's hands, either in collapse, due to perforation, or with a general suppurative peritonitis, with all its complications. It is really surprising, the great number of physicians attending many of these patients before we get charge of them. When I find a mass as large as my fist I commonly ask, "How many doctors have you had?"

We should have a *nil* mortality in appendicitis operations. Therapeutics does not figure in the treatment of appendicitis. There should be no complications. The operation should be done early in the first attack. The common symptoms should be enough to warn and guide an intelligent practitioner. It distresses a surgeon to clean up a neglected groin in which the head of the cæcum and the iliac fossæ are green; the pelvic basin is full of strongly adherent ileum or filth or both; and the peritoneal cavity full of muddy fluid, filth, and lymph.

Unfortunately the general surgeon's inflammatory wall does not save the peritoneal cavity in all cases. Many cases have the adhesions only partly encircling the lesion. The inflammatory products go freely either up or down. We occasionally find huge pus and filth accumulations extending to the right kidney.

In some cases the pelvic basin is charged with pus and filth. Multiple pus pockets are found fore and aft of the uterus in females, and the right tube and ovary and pelvic viscera are also found involved.

In the male, multiple pus pockets are observed about the bladder and puriform accumulations in the pelvis beneath adherent bowel. The distention of the bowel results in numerous kinks and obstructions. A

good number of these patients are dying of obstruction and intraperitoneal sepsis. Operations avail nothing, if you fail to relieve the obstruction early. You may evacuate all the accumulations of filth, remove the gangrenous perforated appendix, make a general satisfactory toilet by irrigation or by a dry method, followed by well placed drains and it will avail nothing if bowel paresis due to distention, adhesions and sepsis is not relieved.

Most of these patients have had a bowl of ice and a nausea basin at their bedside for two or more days before we see them. The old localized abscess recovering slowly after simple evacuation and drainage is not to be classed with the alarming conditions referred to. I have repeatedly known surgeons to remove the appendix, and close or drain without recognizing or looking for general bowel adhesions and filth present in the peritoneal cavity. Again I have known them to remove the appendix and close the incision and in two or three days reopen and find the pelvic cavity full of filth. Appendicitis does not remain localized many hours. If the operations are done early, inspection and exploration are easy, if done late both are difficult. The old adherent non-perforative forms of appendicitis are safe but sometimes difficult operations to do.

The search for an adherent appendix beneath the bowel requires patience and care, and the repair of large and small bowel lesions also require patience and care. I am satisfied it is a mistake to complete any operation for appendicitis when done early, without freeing all adhesions and making a careful inspection. I lament that the general practitioner is not fond of these operations, and not interested in the early pathology. The object lesson, the operation should be published professionally and every active practitioner should see a good number of the operations. It would result in lowering our mortality, greatly lessen the number of complications, and delayed operations. I find in numerous small hospitals about the country, that delayed operations come from outsiders, and not the staff.

The entire staff are in the habit of witnessing nearly every operation done in the hospital, and any member of it would be chagrined to have a patient go on the table late and be prodded by the remainder of the staff.

I have repeatedly done two or three of these operations in the afternoon while the third member of the staff was out urging a patient not far off to come to the hospital at once for the removal of his diseased appendix. Twice this has occurred recently, the patient refusing operative interference, changing doctors and dying in a few days.

If the general practitioner is not accustomed to urging operative interference it is always best for the surgeon to discuss it with the sufferer's parents, family, or friends.

Complicating methods are a mistake. There should be but one method, the clean extirpation of the appendix. The diagnosis made, there should be no delay and but one treatment, prompt removal. Many operators advocating delays also state that it is wrong to wait for adhesions. They also give statistics demonstrating well the disastrous results of the expectant method of treatment, the complications following it, and the high mortality resulting both with and without late surgical interference. But few authors fail to demonstrate that medication is valueless. It is the distressing death-rate from appendicitis that induces me to again open this discussion here. It is difficult to understand why so many teachers and general surgeons advocate delay and tinkering, when losing patients in good numbers after late operations, and often incomplete ones due to complications they are not willing to deal with. If the general practitioner or surgeon is in doubt about his diagnosis, anæsthesia will aid him greatly, in defining the mass, he desires to feel before operating.

The bowel examination urged by Pepper, will aid him in clearing up his diagnosis.

DISCUSSION.

DR. MORDECAI PRICE said that within the last four weeks he had seen four very interesting cases of suppurative appendicitis in children who were from six to eleven years old. They had suffered from delay, from the fact that they were in the hands of a number of men. In each case a concretion was found. In two cases a very well-marked mass could be definitely outlined, the remaining two suffered from diffuse peritonitis with a rapidly rising pulse and descending temperature. In all four cases, the evening temperature ranged from 103° to $103\frac{1}{2}^{\circ}$, and as the child grew worse the temperature lowered until in three out of four cases it was 99° or under. In several of the cases, one or two of the consultants claimed the patients to be improving and stated that they would get well. Throughout a year, all four had been more or less under treatment for intestinal trouble, congestion, catarrh of the stomach and all sorts of troubles of that kind. All of the cases were more or less emaciated; two of them suffered from general pelvic peritonitis, with an adherence of the bowel similar to that of two pieces of paper stuck together with mucilage. Some little force was necessary to separate them.

The adhesions were carefully separated and the abscesses washed out. The general peritoneal cavity was washed from pelvis to diaphragm and in every direction. Dr. Curtin, present at one of these operations, remarked that the

irrigator was "over the left kidney." Attention was invited to this because it is denied that it is safe to wash the whole peritoneal cavity. The cases are all doing well, all with open treatment, and gauze drainage.

The use of purgatives clears up the fact that a case is not one of appendicitis. A free purge will remove all trouble at the head of the colon. Impaction and conditions of that kind occur, which in some cases simulate appendicitis to a marked degree. It will also show that the bowel is patulous, and not kinked and obstructed.

Delay is the cause of all misfortune in the surgical treatment of appendicitis. Dr. Price has been called to a patient who was dead before Dr. Price got to the house, and it was only the third day of the attack. There is a general impression that the moment a patient feels comfortable he is better. A pulse of 130, and increasing in frequency, a subnormal temperature, cold hands and feet, may be noted in a patient who perhaps is also anxious to talk. Such patients are already on the verge of death and it only adds to the mortality rate to operate upon them.

Ninety-five per cent. of the cases of peritonitis seen by Dr. Price *originate in the appendix*. If the diagnosis is obscure and the condition of the patient indicates danger, he holds that it is the surgeon's right and duty to operate at once. The little buttonhole for the exploration is absolutely safe. He himself has never had to do an exploratory operation, and has seen but five or six cases in which he was in doubt whether or not peritonitis was present and in only one of these doubtful cases did he have to operate.

DR. LEON BRINKMAN said that Dr. Price's paper is timely. The necessity of a paper on this subject seems almost incredible. The fact that complications and death result from failure to operate early in the disease should make surgeons more keen to recognize and anticipate such undesirable conditions. There can be no valid reason for delay in operating other than inability to secure the patient's consent. In the majority of instances failure to recognize the condition and to advise operation would seem almost criminal.

The incomplete walling off of a diseased appendix, referred to by Dr. Price occurs only too often. Even in the presence of a considerable amount of exudate there may be no attempt to wall off the diseased organ. The sudden subsidence of pain is always significant of perforation.

Another feature of delayed operations which is also an unfortunate complication is softening of the bowel due to the inflammatory process. If this is present and the appendix difficult to remove, it is in exceptional instances not advisable to make any determined effort to remove the organ, fearing that the injury of the bowel will be just sufficient additional tax upon the patient to cause a fatal outcome of the case.

Fecal fistula, of such frequent occurrence after delayed operations, is preventable in most cases by early operation and is one of the strongest arguments against delay.

DR. J. M. BALDY said that a man who is not competent to make a diagnosis of appendicitis without etherization is not competent to make it with

the help of an anæsthetic. He was astonished that men eminent in this branch of surgery make so many mistakes in the diagnosis; and the fact that mistakes do occur goes to show that there is difficulty in certain lines of cases.

There are two classes of cases of appendicitis that are still a puzzle: one is the class in which the appendix when removed is apparently normal to the eye. He has seen many such and would here pronounce them normal as they appear to the naked eye. The proof that, at least, some such are diseased lies in the fact that the patients have had one or more attacks of peritonitis before their appendix has been removed, and after that have never suffered another attack.

As to the second class: Every one of experience knows how difficult it is to judge when a patient is on the border line of death. Patients with a weak pulse, cold and clammy extremities and apparently with death staring them in the face have been saved by operation when it was least expected. On the other hand, patients have been lost when they might have been saved, had the operation not been decided against. He cited a case that passed through the hands of one of the most eminent appendiceal surgeons in the country. The case was seen on Sunday and operation was declined because the patient was vomiting and apparently dying. Six days later the patient still lived but died under ether at an attempted operation. Localized appendicitis was present with two ounces of pus which could have been emptied in time six days before.

The surgeon who probably is the most prominent in this country cried out loudly against unnecessary operation and yet Dr. Baldy has seen him remove appendices which by the naked-eye appearance seemed to be perfectly normal and healthy. Unquestionably this surgeon operated upon symptoms and probably did so oftentimes; men are very apt to talk one thing and do another.

All surgeons are fully agreed that appendicitis is a dangerous and a surgical disease. If early operation has been done in some cases in which it was unnecessary the patient has been done no harm; in this class of cases the mortality is practically *nil*, there are no adhesions and no pus. On the other hand, a surgeon who operates in such cases will save many which might otherwise develop into general suppurative peritonitis.

It is not fair to *stand* by the operating-table and see an apparently normal appendix removed, and criticize; one should know the patient's history and sufferings, as does the operator, else he is not competent to judge, because undoubtedly many cases exist where repeated and severe attacks of peritonitis occur in the region of the appendix with a minimum amount of naked-eye disease of the organ or its surroundings.

DR. L. J. HAMMOND said the early symptoms of appendicitis are not, as stated in the paper of this evening, referable to the iliac fossa. Therefore, symptoms usually considered classic are really late symptoms where the inflammatory condition has localized itself in the appendiceal region. In all cases

the early symptoms are those of pain and tenderness, extending over the entire peritoneal cavity, but most conspicuously manifest at the umbilical region. The recognition of that fact has led many surgeons to believe that early operations are not accompanied by the reduced mortality that is enjoyed by those in whom the inflammation has localized itself in the right iliac region. These men counsel delay, because of the uncertainty in the diagnosis at this early period, there are more who advise delay when the patient presents such well-marked symptoms as those outlined by Dr. Price.

DR. JOSEPH PRICE, in closing the discussion, said that it would seem that there are certain appendiceal zones in this country, *e. g.*—between West Chester and Norristown—which seem strongly predisposed to appendicitis. Some one used to say that ovarian cysts occurred in an epidemic form in London. Dr. Price was satisfied that there are ten cases of appendicitis in Norristown to one in Philadelphia. Cases of appendicitis have been more neglected in the last year than ever before in Dr. Price's knowledge of the subject. He had twice operated in the West Chester Hospital at midnight, and made an incision between the right kidney and the iliac crest and gotten a quantity of pus. When the patient is found in collapse with all the symptoms of dissolution a surgeon should stay his hand. That these cases die in from nine to fifteen hours is quite sufficient to fortify the position of the operator who refuses to operate at the eleventh hour.

A fecal fistula should never stay a surgeon's hand. When the appendix is so easily removed, it is much better for the patient that four inches of gangrenous tissue be pinched off than that it be left as a source of additional infection. Fecal fistula should not give concern. Early or late, the surgeon should always be equal to its repair.

Concerning anesthetization for the diagnosis of inflammatory products in the pelvis, Dr. Price remarked that the gynecologist is familiar with suppurative forms of disease, his experience has contributed much to the knowledge of appendicitis, and he is not afraid of infection because he is accustomed to all sorts of intraperitoneal infections and inflammatory trouble. The general surgeon is afraid of the peritoneal cavity; is afraid of infection, and says so. Dr. Kelly gives a tabulation of 250 gynecological cases in which the appendix is involved in 25 per cent. Personally, Dr. Price does not depend upon ether examinations. For the diagnosis of appendicitis he begins his examination in the left groin, because it is usually empty and manipulation here gives the patient the assurance that he will not be hurt. He will then permit examination on the more painful right side. Just a touch of the hand to the right and left groins will settle the question. The fingers can be sunk deep in the pelvis on the left side, but on the right not an inch. The only reason for urging an examination under ether is to prevent the delay of a consultation, or the delay occasioned by "We will wait and see."

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Successful Removal of Cataracts in Insane Subjects with Recovery of Mind Attending the Restoration of Sight.

BY WILLIAM CAMPBELL POSEY, M.D.

[Read October 10, 1900.]

The influence of sight upon the mind has been studied by different authors without any marked connection being found between the two, other than the slight alterations in character which occasionally follow loss of sight. The congenitally blind possess as good a mentality as their fellows, and loss of sight the result of accident or disease, save in those who are mentally weak rarely does more than temporarily disturb the mental processes, for after the first grief and depression consequent upon the realization of the loss of the sense of sight is assuaged, life is continued under changed conditions, with reason unaffected. If, however, the individual, the subject of this misfortune is intellectually weak, it is not extraordinary that the links in the chain of normal cerebration should be broken and that symptoms of insanity should manifest themselves. As illustrative of this latter class, the writer wishes to cite two cases in both of which loss of sight precipitated loss of mind, and restoration of vision was attended by immediate and permanent return of normal mentality.

Such cases must unfortunately be rare, for although the writer by virtue of his connection with several large hospitals for the insane has removed cataracts from the eyes of inmates of these institutions and has restored useful sight in many instances, in only one of these has he noted any improvement in the mental condition. After quite an extensive search through the literature also, he could find but two cases which were at all analogous, that of Bouissin and Moulton. The case of the

former author was that of a young man, who had lost his mind with the development of cataract and recovered it again when the cataract was removed. In Moulton's case the eye was lost when the subject was six years old by a burn with caustic. When twenty-eight years of age iridocyclitis supervened in the same eye, and at forty years of age the patient suffered from such violent headache and progressive melancholia that enucleation was demanded and was followed by immediate relief to the mental condition. In explanation of his case, the author states that the headache, insomnia and melancholia must have been aggravated, if not caused in a reflex way by cicatricial compression of the terminals of the nerves supplying the globe, as a result of which vascular disturbances were produced in the brain.

The first case which the writer reports was seen by him in his capacity as consulting ophthalmologist to the State Hospital for the Insane at Norristown, at the request of Dr. D. D. Richardson, chief physician to the institution, about three years ago. The patient was a male aged forty-five years, and was said to have cataracts which had rendered him practically blind for three years previously.

Upon consulting the records of the hospital which were kindly furnished by Dr. Richardson, it was found that his loss of vision was attributed to the grippe, of which he had three bad attacks, the first one dating back six years. It appeared further from his statements that he had seen several oculists, and that he had been advised by them that his ocular complaint was of the nature of cataracts, but of the kind which were not amenable to operation.

Although he would date his mental infirmity to the commencement of his eye trouble, it was ascertained that he had really inherited a disposition toward insanity from his father, who had had acute mania brought on by financial troubles, whilst it was elicited also that a brother had been confined in an asylum for a year on account of a sun-stroke. He had four other brothers and sisters, all of good health and mentality. The patient was a farmer, of temperate habits and of good health, save for slight attacks of rheumatism. He was married when twenty-one years of age and as a result of this union he had four children, three of whom are living and well (one aged twenty-one years, another thirteen years, and another seven years), one having died in infancy of scarlet fever.

At about the time when his vision began to deteriorate, his mind gave evidence of failing also. He became irritable, morose, and greatly depressed, and his demeanor to those about him changed. In place of being the best of husbands to a devoted wife, he thought that she

together with the rest of his friends, was plotting against him and was desirous of taking his life. In recrimination he threatened to kill her and his mother and brothers as well, and finally tried to take his own life with a razor.

The patient was admitted into the hospital at Norristown on April 15, 1897. His general bearing was one of great depression, and though he was not at all excited or disturbed, he persisted in the delusions of persecution just detailed. His memory seemed good for remote, but poor for recent events. Although quite blind, he was not helpless, for he could dress himself and was clean and orderly. His bodily functions were carried on normally, and there were no phenomena present to indicate interference with any of the motor or sensory centres.

Despite rest and tonic treatment, the patient's condition remained the same until it occurred to Dr. Richardson that the restoration of his sight might have a beneficial effect upon his mind, and he accordingly requested the writer's advice.

An examination of the eyes revealed cataracts on both sides. The lenses presented a mother-of-pearl lustre, and there were numerous pearly globules scattered throughout the anterior cortical, especially in the right eye. Both eyes were quiet, the anterior chambers were of normal depth, the pupils were 3 mm. in size and the irides responded equally and freely to light and accommodation stimuli. The tension was normal in both eyes.

Although inclining to the view that the cataracts were probably of a complicated variety, on account of the comparative youth and the report, though indefinite, which was obtained from the patient, regarding the diagnosis of inoperable cataracts from the oculists whom he had previously consulted, the writer, nevertheless, determined upon the extraction of the ripest lens, and the consent of his friends was accordingly obtained for the procedure.

As the patient objected most strenuously to the operation, he was etherized and the operation performed under this general anæsthetic. With the assistance of Dr. Richardson and the hospital staff, the lens was happily delivered without accident, by the combined method of linear extraction. A firm compressed bandage was applied to both eyes, and rigid instructions given to a corps of trained attendants to keep the patient as quiet as possible. As is the practice of the writer in all similar cases, to avoid any possible mischief from interference with the dressing, the patient's hands were confined in a straight-jacket for several days after the operation. The healing was uninterrupted, the

patient, being allowed out of bed at the end of a week, and the bandages being removed at the end of the tenth day.

A noticeable improvement in his mental condition began to make itself manifest as soon as he was permitted to see, even before the correcting glasses had been prescribed. His mind seemed to clear as though by magic, and a sense of his surroundings, and the indignities which he had committed upon his wife forced themselves upon him, and he was anxious to obtain his discharge from the hospital and to make reparation. At the end of a month his correcting glasses were given him and his mind was in such a condition a few weeks later, that he was permitted to go home on parole.

More than two years have passed, but there has never been a relapse in his mental condition, for he has behaved himself quite rationally and has merited Dr. Richardson's judgment in releasing him. About a year ago, as the patient was anxious to have the fellow eye operated upon, his request was acceded to, although the cataract was far from ripe and he was admitted to the Howard Hospital where the writer successfully extracted the lens by the combined method, obtaining full vision in this eye also, with the proper correcting glasses.

One cannot help contrasting his condition now with that of three years ago. Then, he was a wretched blind inmate of an insane hospital anxious to take his own life, now, he is a sober, rational and happy member of society, with full vision in both eyes, and extremely grateful for what has been done for him.

In addition to the psychological interest which attaches itself to this case, there is a pathological one which should be mentioned as well. After the patient had regained his reason and was able to give an intelligent history of his ocular condition, the writer learned that among other oculists of repute he had consulted Drs. W. H. Dudley and Charles McIntyre, of Easton, and that it was these gentlemen who had told him that his cataracts were of the inoperable variety. As the outcome of both of the operations had been so favorable, and as a careful ophthalmoscopic examination which was made after the removal of the lenses failed to reveal any evidences of pathological changes in either eye, the writer determined to write to these gentlemen to elicit from them what conditions existed in the eyes prior to the admission of the patient into the hospital. Dr. Dudley wrote that he had seen the patient first on August 4, 1895, when he obtained a history of failing vision for six months previously, more especially, however, for six or eight weeks prior to the consultation. At that time, the vision in both eyes equalled 15/L, the reduction being due to a dense haze of his vitreous

humor, most marked in the region of the maculæ. These findings were substantiated by Dr. McIntyre shortly afterward. This gentleman placed the patient on gradually increasing doses of muriate of pilocarpine, and thought that he noticed a thinning in the opacities. Despite many warnings from his oculists, the patient still continued to abuse his eyes, reading far into the night at times and giving them but little rest during the day. The vitreous haze increased, and soon the lenses became clouded to such an extent that a view of the fundi was no longer possible. It was at this time that he was told that he had cataracts, and that they were of the inoperable variety. He then passed out of these oculists' care, on account of the condition of his mind, which had become so bad that his removal to the Hospital for the Insane at Norristown was necessitated.

Having studied the case from its early stages and having recognized the complicate character of the lenticular opacities, there is no question but that these gentlemen were quite right in their disinclination to advise a removal of the cataract by operation. What is most singular, however, is the total disappearance of the vitreous haze as well as the failure to find any ocular lesion which might have caused it, for, as just stated, careful ophthalmoscopic examinations of the fundi since the operations have not revealed any area of choroiditis or of retinitis, while the full vision with correcting lenses and the normal extent of the visual fields would also indicate the absence of any pathological changes. The patient received no medicinal treatment in the hospital, other than the administration of house mixtures at regular intervals for the relief of constipation, etc., so that the absorption of the vitreous opacities cannot be attributed to drugs.

The second case occurred in the private practice of the writer and was first seen by him three years ago, her family physician being anxious that she should have something done for her eyes, for although her sight had been failing for several years, it had now become reduced to such a degree that she could no longer read, and it was only with great difficulty that she could see to walk about the house. Coincident also with her loss of sight, her mental condition had undergone considerable change which had occasioned him much worry, and her family the greatest anxiety and annoyance.

Although sixty years of age, the patient was a well preserved and healthy-looking woman. Her family ties were all that could be desired, her husband being a man of the most exemplary habits, and her daughters, young ladies of refinement and kindness, had devoted their lives to add to her happiness and comfort. Despite these surround-

ings, and ever since her sight had commenced to fail, the patient had been strangely depressed and melancholic. She continually brooded over her visual condition, and was possessed of the idea that she would soon be irretrievably blind. She steadfastly refused for a long time to have an oculist called in consultation, but finally her prejudices being overcome in a measure by the combined efforts of her physician and family, the writer was requested to call at her house for the purpose of ascertaining what the ocular defect might be, and whether it was possible to correct it. The writer will never forget the scene which ensued upon his admission into her chamber. As soon as his presence in the house had been announced to her, she had thrown herself upon the bed and had given way to the most passionate sobbing, saying that she wished she were dead, and pressing her hands over her eyes declared that she would not permit them to be looked at, but when the writer entered the room, she jumped up from the bed, entered upon a violent tirade against him, and insisted upon his forcible ejection. After great difficulty and no little mental and moral suasion, she was finally pacified sufficiently to enable it to be ascertained that there were cataracts, that the lens was far from ripe in her left eye, and that the lens in her right eye was but little affected, the media being sufficiently clear to permit a satisfactory view of the fundus of that eye by the indirect method.

As the cataract on the left eye was so immature, and the vision in the right eye appeared still good, the author was loath to undertake the extraction of the lens, particularly as the patient kept constantly threatening serious consequences if the operation did not result successfully. A postponement of the extraction was therefore advised and an effort was made to improve the vision of the right eye with glasses. After several tests the writer succeeded in gaining her confidence sufficiently to enable him to prescribe a concave sphero-cylindrical combination for the eye, with which she had 5/xv vision. This lens was worn for some months, and the mental condition seemed somewhat improved, but after a time the patient became so depressed and profoundly melancholic that extraction of the cataract was decided upon in the hope of inducing a better state of mind, as things were now at such a pass that it was almost impossible to live in the same house with her. Her mein was one of such profound despair and dejection that it seemed almost that the services of an alienist were demanded rather than those of an ophthalmologist.

The operation being decided upon, the necessity of its performance was communicated to the patient, and in order to shorten the time of

apprehension as much as possible, the day following was set for the operation, and despite the objection of the patient, it was performed under cocaine at that time. The lens was extremely soft, but all of the cortex was finally extracted by careful manipulation and a clear pupil obtained. Although just before the operation the patient behaved very badly and was only restrained with difficulty, during the few moments of its actual performance she was remarkably quiet, so that the writer was enabled to operate unembarrassed by any struggles upon her part.

The improvement in her mental condition became very marked as soon as she was convinced that the cataract had been removed and that she could see clearly with the eye. She was calm and quiet and her demeanor toward her physicians and nurses was most exemplary, and continued so during the entire after-treatment. At the end of six weeks she was given her correcting glasses with which she had full visual acuity. The writer has seen the patient at infrequent intervals since the operation and has wondered if the contained and gracious woman who visited him was the slovenly termagant of two years before. She regained her normal flow of spirits with her sight and has re-entered into the pleasures of her family circle with quiet happiness and dignity.

As has been stated, such cases are rare, but should serve to teach us what may be accomplished by proper measures for the unfortunates, who are too often relegated to the list of the hopelessly insane. Although all efforts exerted in their behalf may be unavailing, every attempt which could better their condition should be essayed and the return of even a few of them to society will amply compensate for many failures.

DISCUSSION.

DR. CHARLES W. BURR said that through the kindness of Dr. Posey he was able to see the first one of these patients after he was well, and Dr. Burr thought that the explanation which the man himself gave, which is the simplest, is the true one; and he did not think there was need to go seeking for reflex causes or disturbances in the circulation of the brain to explain why this man got well. The man's own story was: "Doctor, I am a working man, I began to lose my sight; I could not work; it was work, or starve. I became depressed and the result was insanity. I had been told by several skilled physicians that it would do no good to operate. When it was proposed in the asylum to operate I opposed it on both rational and irrational grounds. When the bandages were removed from my eyes and I realized that I could work I stopped being depressed."

These recoveries are due to the fact that, fortunately, all are not able to go insane. In order to become chronically insane one must be born with a certain type of brain. Every once in awhile there ought to occur a man of such mental instability that so long as things go well he will keep sane, but if he undergoes a great stress he will lose his reason. This of course was a functional insanity. Had he had organic brain disease, operation upon the eyes would not have been followed by cure. That is the real explanation. In all these cases of insanity, the eye like all other organs ought to be put in the best possible state. Diseases of many kinds may precipitate an attack of insanity and cure be followed by their removal.

DR. G. E. DE SCHWEINITZ said that he had notes of nineteen extractions of cataract in sixteen insane patients. All of these operations except one were operative successes and in all but three of them the operation was followed by restoration of vision, 20/200 or better having been secured. In one case there was infection of the flap producing a localized suppuration and afterwards an opacity of the cornea which vitiated the visual results. The patient was absolutely uncontrolled and frequently pulled off her bandages and probably with her fingers infected the flap, or else the infection came from chronic bronchitis from which she suffered. In another case the patient died suddenly on the second day after the operation, which was a perfectly smooth extraction and promised to be an equally smooth recovery. A post-mortem examination was not obtained but as the patient had albuminuria in addition to her insanity, it is probable that the cause of death was due to uræmia.

In a third case, the patient became violently insane during the extraction, struggling so severely that it was with the greatest difficulty that the section was completed. The healing was normal and there was no prolapse of the iris although it was a simple extraction, and a year later vision seemed to be tolerably good, although the patient's mental condition was such that no accurate test could be made and ophthalmoscopic examination revealed a whitish mass in the vitreous which either was lymph or else possibly a detached retina. So far as the classification of the insanity is concerned, the following was stated:

Senile dementia 9; active mania 1; dementia with suicidal tendency 2; insanity following epidemic influenza 1; melancholia 4; alcoholic insanity 1; illusional insanity 1.

In none of these cases, in so far as Dr. de Schweinitz was aware, was there the slightest amelioration of the mental condition by the restoration of vision. In two, perhaps, the patients were a little more cheerful after they were relieved of their cataracts, although they continued as heretofore to be residents of the insane department of the Philadelphia Hospital. One patient, curiously enough, was made decidedly worse, so far as the mental condition is concerned, by the operation. She was an ordinary melancholic, and after the operation, which secured her a vision of 6/12, she began to have hallucinations that the people surrounding her were conspiring against her life.

The only explanation is that previously she could not see the people in the ward, but after she received her glasses she was able to recognize those who surround her and this restoration of vision made her suspicious. She believed that the people she saw talking were conspiring against her. So aggravated did this condition become that it was necessary to place her in confinement. It is a good example of the fact that too much knowledge of one's surroundings is not always advisable.

DR. A. A. ESHNER said it must be borne in mind that morbid conditions often have a complex etiology, and in this connection some recent writer has made the statement that disease must be looked upon as a closed chain, of which, if any single link be missing, the morbid condition does not result. If, in a case of mental disease the condition has arisen as a result of, or has been superinduced by, visual defect dependent upon opacity of the crystalline lens a fortunate result with regard to the mental state may ensue, as in the case related by Dr. Posey, if operative intervention is practised. On the other hand, if the cataractous condition occurs as an incident in the course of the mental disease, it cannot be expected that its correction would have any influence upon the insanity.

DR. C. W. KOLLOCK (South Carolina) said he had seen but two cases which might have some bearing on this subject. One was a woman whose mind was considerably affected, but not violently. She was very unruly during the operation, as was Dr. deSchweinitz's patient. She grasped Dr. Kollock's hand and only released it upon making some very severe threats. After the removal of the cataract she was much more tractable than before. The other case could hardly be called one of insanity: an old Irish woman who had visions of animals, snakes, and other disagreeable objects, so much so that her physician and family thought her mind was deranged. After the operation all of these figures disappeared and she had no more such trouble.

DR. F. SAVARY PEARCE said that in the earlier cases of mental depression, resulting from worry over an eye condition, one should expect a favorable issue from the removal of the cataract; in insanity caused by other conditions, the removal of the lens would be less successful in its results. In melancholia associated with cataract a more favorable result might be expected than in any other form of insanity.

DR. MORDECAI PRICE suggested that the thanks of the Society were due to Dr. Posey for his suggestion that all irritating causes of deviations from health in any individual must have a very great influence upon their mental condition. Dr. Price had seen numbers of persons who are absolutely insane, suffering from diseases peculiar to women, and who, the moment the disturbing influence is removed, improve in their mental condition and return to their homes as useful members of society. The subject of insanity resulting from deviations from health in conditions such as cataract, tumors, pelvic diseases, etc., is one of the most important that can occasion a discussion in medical societies. If good is to come from the correction of these deviations, operation should be done early in the disease from which relief is desired.

DR. POSEY, in closing the discussion, said that in order to avoid complications at the time of the operation, he advised that ether should always be administered, as these patients are, of course, perfectly irresponsible. One would scarcely look for improvement in the mental condition if the insanity had been of long standing and was organic, as was the case in most of Dr. deSchweinitz's cases. In both of Posey's cases the mental disturbance was probably only functional, hence the favorable result obtained.

Clinical Laws of Immunity of Disease.

BY LAMBERT OTT, M.D.

[Read October 10, 1900.]

Observations on the individuality of diseases apart from their bacteriological relation justifies certain conclusions which in some instances can be verified by cultures and serum-therapy, and in others the results are not so gratifying. By the individuality of an infectious disease one understands that maladies present certain characteristics as prodromata, in some an eruption, a time-limit, a created permanent immunity, a defervescence and incidentally complications and sequelæ.

The expression of any one disease is as varied as the features of the human race, and what forces lie concealed to modify its course and cause the manifold variations is one of the potential questions of the day. A strong, plethoric and energetic young child will have an active, severe, rapid and oftentimes a fatal attack of pneumonia, and a frail child will have a lethargic, slow and light attack of the same disease, it thus seeming that the degree of severity of the disease paralleled the nature of the material attacked. This we can call one element in producing variations of degree and probably there are many more clinically evident but bacteriologically not yet ascertained. The many forms of pneumonia are due to the complexity of the tissue involved and clinically they are easily differentiated, yet how strange that once a lung having been pneumonic, predisposes to a recurrence, a susceptibility being created, or a nidus formed for the better reception and multiplication of the pneumococci, if they incidentally pass in by the inspiratory act. Another disease supposed to be microbic in origin is erysipelas; it is characterized by high fever, a migratory tendency with pathognomonic cutaneous involvement, a time-limit, defervescence and a recurrence in the same individual. Thus two diseases, pneumonia and erysipelas, instead of producing an immunity inversely create a proneness to a recurrence of these diseases in the same person.

A curious accidental occurrence is the following: I vaccinated a child in the period of incubation of measles and just as the rash was appearing, the vaccination having reached the vesicular stage, the vesicle seemed to sink and dull in appearance and not till after a delay of six or seven days, when the disease (measles) began to recede, did the suspended vesicle again raise its head and pursue its normal course. This was to me a very striking incident which I have tried to repeat but I have been unable to obtain the proper time for a dual manifestation; but whenever measles pursued a rapid course the vaccination remained in abeyance till the disease had spent itself, the stronger disease, morbilli, inhibiting the weaker, vaccinia. Evidently they cannot co-exist in the one person; but however kindred they are in external expression, their mutual influences exist only in so far that the stronger inhibits the weaker.

I also conclude from clinical data that primary vaccination varies in its course and intensity, possibly being influenced by a degree of inherited immunity, for I have found that primary vaccination in children born of a mother having had smallpox does not pursue the intense and active course it does in children born under opposite conditions. Varicella, the twin brother of varioloid, with its indefinite prodromata, its irregular course, skin eruption and subsequent pitting, produces perfect and permanent immunity against recurrence, but although so kindred in appearance to light forms of varioloid it cannot coexist with the latter diseases for I have seen varicella precede the development of varioloid in the same child, and thus pursue their usual course apparently possessing no inter-fluences by which either of their manifestations were lightened or modified. How far the combined effect of two diseases occurring at different times in the same individual serve to produce immunity against a third disease, is yet a mooted question, but, clinically, I have found children having had scarlet fever and pertussis at different times—for I have never seen them coexistent—are less susceptible to the contagious element of diphtheria. Furthermore, children susceptible to contagious follicular tonsillitis seem less liable to contract diphtheria.

Measles and whooping-cough travel as pairs, and often a child will have the two diseases, but, invariably, one preceding the other. This combination does not produce immunity from scarlet fever, but I have found that such children are less liable to contract diphtheria. Another suggestive occurrence was the following: Three children in the same family had contagious follicular tonsillitis and the fourth child has at the same time acute articular rheumatism and escapes the tonsil-

lar inflammation. This is one of the clinical phenomena where the throat disease could be classed as rheumatic, but, how can we eliminate the contagious element if there is one cause for the two different diseases? It is possible that the rheumatic attack in this child was a systemic infection from the same cause as produced the infectious tonsillitis in the other three children. In two children in the same household, the younger child has a severe attack of scarlet fever and the other child, in constant daily contact with the sick child, only acquires a severe follicular tonsillitis and apparently escapes an attack of scarlet fever, as is evident by the non-appearance of renal or other sequelæ. This is a common observation among physicians, hence, in the older works in practice you find such cases classified as scarlet fever sine eruptione.

The child having a light form of scarlet fever, measles or smallpox or any of the infectious diseases with their characteristics as permanent immunity against a recurrence, etc., will in many cases find that the maternal side of the parentage has passed through a severe attack of the same disease in childhood and imparts a part of this acquired immunity to her progeny thus producing an inherited partial immunity. I have found the acquired immunity of the male parent does not transmit the degree of inherited immunity, although I believe it has its influence, that we find in the maternal side; and when both parents have had the disease from which the child is suffering you find generally a light attack. When neither parent has had any of the infectious diseases, their children usually suffer with correspondingly severer attacks.

Syphilis is a transmissible, eruptive, inheritable and an immunizing disease and its laws bear in several points an analogy to the ordinary eruptive diseases of childhood. The laws deduced from syphilology are as follows: A syphilitic husband and a non-infected wife can beget issue free from syphilis. If the mother has syphilis, the issue is more likely to be syphilitic and in fact, as claimed by some well-known syphilographers, is always tainted. We have less often a syphilitic child born of a healthy mother and a syphilitic father, and the mother remaining immune even to pus inoculations, so that in after life there is no manifestation of any lesion of syphilis.

Syphilis is inheritable, scarlet fever and smallpox are not, otherwise, their natures bear a similarity; therefore, if a syphilitic mother can transmit syphilis to her issue, why should we not recognize an acquired-scarlet-fever-immune-mother can transmit this immunity to her issue, by which we can explain many of the lighter cases in children of the same family and the number of severe cases in children of another

family. One seldom finds the extremes of a very light case and a malignant case simultaneously occurring in children of the same mother.

When we survey the diseases that produce in the human a permanent immunity, we find a striking resemblance in their essentials: first we have a point of infection, second a period of incubation, third prodromata, fever and the concomitant symptoms, then follows a skin eruption, which labels the disease as to its character and varies decidedly in its structural changes. The deeper the skin-structure involvement the longer the period of incubation. Rapidity and heightened activity characterize the prodromata of scarlet fever, and after the lapse of two days, or of even less time, we have the dermatitis with its subsequent desquamation, which is only a superficial skin involvement.

Insidiously and gradually though increasing in activity for five or six days are the prodromata of smallpox and measles, which produce deeper structural skin changes with some of their later indelible impressions. Syphilis has its period of incubation covering six weeks, followed by the skin manifestations which vary from a macula to the serpiginous ulcer and even involve structures below the skin. There is a longer preparation of the *materies morbi* in a way we do not now understand when the cutaneous manifestation is of longer duration and more destructive. Outside of the eruptive fevers producing a permanent and absolute immunity is whooping-cough, and if this disease ever exhibits a cutaneous sign hitherto undiscovered, I should say that no disease will produce permanent immunity until skin phenomena be a part of its expression. You may at once say how about erysipelas, and I reply that the latter disease is only a local skin involvement and not a general cutaneous manifestation as we find in the eruptive fevers. Why this cutaneous manufactory, if I may so call it, should be an important contributive element in producing subsequent and unalterable immunization is one of the questions of the day.

Systemic conditions having local mucous membrane manifestations produce a susceptibility to their occurrence and do not create an immunity similar to the eruptive fevers. This we see in some forms of pneumonia, contagious bronchitis, the different forms of stomatitis of infants, gastro-intestinal catarrhs of microbic origin and the periodic rhinitis commonly called hay fever.

If there can be an inherited predisposition to disease such as the dyscrasia, the diathesis, and we accept as a fact the transmission of syphilis, scrofula, tuberculosis, asthma and the uric-acid phenomena, why is not an immunity against diseases where previous systemic conditions are

so placed, as readily transmissible as predispositions and susceptibilities? The neurotic type, insanity, and other nervous diseases peculiar to families are strange perversions capable of transmission, and producing the true prototype of their progenitor. When we accept the doctrine that all infectious diseases are due to pathogenic organisms can we not imagine their habits or laws of existence from the clinical signs of disease. The germ gains a nidus within the body, multiplies and secretes toxins and the expression of disease is their evidence of activity. Since no two infectious diseases can coexist in the same individual, we deduce the law that micro-organisms cannot be coexistent or in dual control in the same individual, and we can with reason assume that one is stronger and inhibits the weaker. If syphilis is a germ infection then we have the exception of the coexistence of gonorrhœa and syphilis in the same individual.

Since all infectious diseases present a time-limit we deduce the law that micro-organisms multiply and secrete toxins until the point of systemic toleration is reached, which if not endured, dissolution follows and if resistance is evident, they at that period cease activity and become inert within the body but capable of assuming activity in new pabulum. What that resistance is in cell life is one of the great questions of modern pathology.

A subject once infected by specific micro-organisms, a second infection cannot follow therefrom, deducing the law that a field when once in their possession cannot be reoccupied, thereby producing a permanent immunity. If we accept the opinion that the pneumococcus is the cause of pneumonia and a specific streptococcus pyogenes the cause of erysipelas then we have two decided exceptions to the law.

A system rendered immune by one species of bacteria is in no wise, so far as we know, protected against other germs that have their own individual expression of disease.

I offer the following thought for future verification, namely: that the combined immunization of several diseases, as measles, scarlet fever and whooping-cough in the same individual reduces the susceptibility to infectious diseases, especially diphtheria, and produces a limited immunity. The diseases having skin phenomena as a part of their expression produce a more stable immunity.

Diseases that produce immunity must necessarily be infectious. The varied prodromata and time-limit in disease indicates slow or rapid growth of bacteria and their gradual or rapid exhaustion, illustrating one of the laws of life that rapid growth has shorter life and slower growth has longer life.

In conclusion I do not think that the day is far distant when we can humanely abstract a serum from an infected child, say a scarlet fever case, and by a process of attenuation and sterilization inject this altered solution into healthy children thus immunizing them against further infection.

DISCUSSION.

DR. JUDSON DALAND said that the theory advanced by Dr. Ott—that possibly there is transmitted an immunity by the parent—is certainly very attractive and it explains why certain cases escape disease and others acquire it; but it would be rather difficult to prove this theory. The reference made to a case of exposure to scarlet fever, recalled another—that of a mother about giving birth to a child, and upon the same bed was a child ill with scarlet fever. The mother and the newborn both escaped the disease. Whether the parents had had scarlet fever or not was not remembered, but this was unquestionably an example of immunity of the newly born infant exposed to scarlet fever.

In sthenic pneumonia the coagulability of the blood is markedly increased and the mortality in this kind of pneumonia may be in part dependent upon this fact. This was not asserted to be true but was simply suggested.

DR. W. L. COPLIN said there are features of this subject which belong to the pathologist, and in this aspect there is a wide difference from what is seen clinically. There can be no doubt but that there is increased resistance by admixture of germs. It can be seen that one organism will grow with activity and produce disease very promptly while the other disappears. A number of attempts have also been made to produce immunity to one organism by inoculation with another. There is very good reason for believing that by any means available at present one cannot hope to induce the kind of immunity reported by Dr. Ott as being clinically recognized.

The immunity induced in mice and rabbits seems to be transferred almost entirely on the maternal side. There is almost no evidence of transmission by the male. Dr. Coplin believed that the immunizing body passed from the mother to the foetus through the placenta.

From an experimental point of view he thought one could not expect immunity from one disease because of the presence of another. He did not remember that Dr. Ott especially insisted upon that point, and aside from it Dr. Coplin placed great interest in the clinical aspect of the paper.

DR. A. A. ESHNER said the possibilities of the transmission of either susceptibility or immunity to the child raises an interesting question as to the transmissibility of acquired or congenital characteristics. It is the growing belief among biologists that only inherent characteristics can be transmitted from the parent to the child; and that acquired characteristics cannot be so transmitted. The variety of immunity that is dependent upon cellular activity it seems might be transmitted from either parent to the offspring, while that

element of immunity which is dependent upon the presence of certain chemical agents in the blood could be transmitted necessarily only from the mother in the same way that blood taken from a horse immunized to diphtheria would be capable of conferring upon any other animal immunity to the same disease.

As to the occurrence of more than one affection in a single individual, there are numerous observations of this kind. Thus, many instances of associated typhoid and malarial fever conferred by the presence of the Gruber-Widal test and of malarial parasites in the blood, have recently been reported, and there are on record also cases in which there have been present three infections simultaneously. Two years ago Dr. Eshner had under his observation a case in which typhoid fever, pneumonia and tuberculosis existed in the same individual. A similar case has been observed by Dr. Cohen, and Dr. Eshner has reported a case in which syphilis, typhoid fever and tuberculosis has been associated.

DR. S. S. COHEN said the point made by Dr. Eshner in regard to the transmission of cellular immunity or of chemical immunity is the keynote of a discussion of this kind. If one remembers, for example, that a simple infection, such as measles, when first introduced among certain islanders by immigrants from England became a scourge of the most horrible character; and, if again it is recalled that, according to historical accounts, the infection of syphilis is much less virulent to-day than was the "Neopolitan," or "French" disease of the sixteenth century; and, if in a similar manner the acute and chronic infections in general, are traced, it will be seen that gradually, in the evolution of the race, there develops a greater specific as well as general resistance to infection, and that this must be transmitted as other characteristics, through the sperm and ova, and affect the whole organism. On the other hand such immunity as occurs in a child of an infected mother who has become immune, is simply a mechanical transmission through the placenta of a certain quantity of antitoxic serum which gives immunity for a limited time to the individual in whom it is introduced. The experience of Dr. Cohen in the course of such immunities differs from that related by Dr. Ott. Dr. Cohen reported an instance of this in the case of two children whose father and mother had not had scarlet fever, but the children suffered from scarlet fever simultaneously; one a severe case, and the other without eruption, and only recognized by the late on-coming of dropsy. In such an instance there was no transmission of immunity from the immune parents, because there is, as yet, no organization within the human race of cellular immunity to scarlet fever; and the maternally transmitted immunity, as it might be called, has been given as it were accidentally by the placental injection of antitoxin.

The great question of immunity is worthy of all the attention, reflection and exact study that can be given to it, and the Society is therefore indebted to Dr. Ott for making us think about this subject and Dr. Cohen would have been glad had Dr. Ott furnished the data upon which his conclusions are

based. All form vague impressions, and unless these are compared with the data upon which they are founded and the data accumulated by others, one is likely to go astray. Individual experience often differs much from the experience of others and unrecorded, unclassified and unanalyzed experience sometimes gives rise to error because one particular event stamps itself on the mind and memory more forcibly than perhaps 100 other contradictory events.

DR. OTT in closing said, he had gathered data which led him to believe that children having had scarlet fever, whooping-cough, and measles are somewhat immune against the poison of diphtheria. He offered this suggestion for future observation. He had not been able to diagnose two infectious diseases co-existent in the same individual by the clinical manifestations, but he had been told that bacteriology has established the fact of their co-existence notwithstanding.

He believes in the maternal-transmitted-immunity to a limited extent irrespective of what disease it may be.

He did not wish to be understood as stating a dogma concerning the laws of immunity, but to his mind it is a wide field and one in which some great discoveries are possible. Bacteriology is gradually solving some of these problems, and only through the correlative association of the latter science and the clinical evidence of diseases can the truth so valuable to a proper understanding of these laws be ascertained.

Heart Disease or Epilepsy.

By F. SAVARY PEARCE, M.D.

[Read October 10, 1900.]

It shall be the endeavor of this short paper to reinforce the fact of the possible existence of great similarity between epileptoid phenomena—a *petit-mal*—where the cardiac action is affected primarily or where the so-called “heart failure” predominates in its symptomatology—and syncopal attacks independent of the epilepsy neurosis.

When we refer to heart disease it is not meant in its genetic sense, but is so designated because cardiac irregularity generally producing the syncopal attacks closely resembling those of organic origin when obtaining in an aberrant case of *petit mal* are to denominate some disorder of cardiac function. Indeed, a murmur heard over the *præcordia* or physical signs of arterio-sclerosis would, in the majority of cases where there is any difficulty in diagnosis, pretty positively suggest the syncope to be due to organic disease. These cases are easy enough. But it is for determining in the very incipency a cardiac involvement in

the epilepsy neurosis, from that of a hysteroid, neurasthenic, or fatty heart failure in a minority of cases that we shall here speak.

Hence the justification of the above title. And it might seem at first blush that a differential diagnosis between the several conditions indicated was easy to establish by the physician who has a wide experience, also through careful observation of history with other available symptoms or physical signs of the disorder of which the heart-failure is but one of many phenomena in the clinical picture; still as stated, there do remain a few puzzling cases.

This subject was first brought to the writer's mind several years ago in the case of a man, aged thirty-three years, when my consultant, the late and lamented Dr. J. M. Da Costa was held in doubt, and where four other physicians had all been unable to determine the nature of syncopal attacks coming on at irregular times, and in which a "fainting spell" might well describe a majority of these seizures. At times, too, consciousness was entirely preserved in the attacks, and there were up to that time, no convulsions. There were no physical signs of heart disease or vascular sclerosis, and no œdema. Urinalysis and eyegrounds were negative. Exercise or mental strain seemed equally to induce attacks which were attended by no sequelæ, but continued to recur three or four times a week in spite of dietetic, hygienic and medicinal treatment, the latter consisting principally of nitro-glycerine and bromide of soda. A year later the patient developed convulsive seizures alternating with these typical syncopal attacks. It should be stated that a slight sunstroke several years before the initial symptom developed, was pretty clearly the only obtainable cause. The man died a year ago of meningitis.

Here was a case, then, of irritative lesion of the vagus centre in the medulla, gradually rising to the motor cortex, and due to an insidious meningo-cerebritis from sunstroke. I should have stated that in the syncopal attacks seen in this case, a characteristic point was noted as to the slowness of the pulse. The heart, though beating feebly, yet did not average over 54 per minute, and was at times very irregular, but did not intermit.

CASE II. I have seen the reverse of this above result, and of a dubious import, too, of heart failure attacks, in the case of Mrs. A., now aged thirty-seven years. There is no neurotic heredity. Shortly after she was out of childbed with her first and only child, and while in apparent health, she ran to catch a train, and was also greatly alarmed lest she be left over night at an out-of-the-way station. Next day she developed a syncopal attack in which her relations and her physician thought she

would die, but after an hour, by the vigorous use of heat and hypodermics of strychnia and digitalis, she was restored to consciousness. A very feeble heart action has persisted ever since. For the past ten years she has been subject to syncopal attacks, at times three to five in one day. During these the pulse is thready, 100 to 120 per minute, she is quite unconscious for a few seconds—the consciousness returning before the pulse beat comes up to the normal for her, of 85 to 90 per minute. This lady is in no wise hysterical. There is no organic disease of the heart. There does seem to be slight auricular dilatation during the attacks as shown by percussion.

Certainly in its onset ten years ago, when the peculiar affection began, there was reason to think of *petit-mal*, which was so diagnosed by several good physicians. To-day she presents no signs of cardiac disease other than these functional attacks; she is not hysterical, but slightly neurasthenic from her prolonged, may we say, functional heart disease. She has never had a convulsion; and on slight exertion is liable to attacks of heart failure. I do not believe this lady has hysteria. The heart attacks are perhaps due entirely to central inhibition of the vagus centre, at first brought on by shock and cardiac dilatation. The vagus has never regained control.

CASE III. Charles B., aged eleven years; father died of organic heart disease, result of rheumatism. Patient was never a very strong boy, is nervous, but never had distinct nervous disease. Has never had rheumatism. In May, 1897, was struck on the head with a stick by another boy. This did not produce any ill effect at the moment. The same evening, at three o'clock, he had an attack of what his mother called "wandering in his mind" for a few seconds; then complained of being faint. In a week he had another fainting spell alone, and before and after which he complained of "fluttering" about the heart. There is never real pain of anginoid nature. The attacks have come on at irregular intervals ever since. I have seen him in one attack; he was "chilly," extremities cold, heart 108 per minute. He was quite conscious, excepting for a second or two. Attack lasted about three minutes. He was perfectly flaccid. There was a slight anæmic murmur over the left base. This boy has been put on hæmatics with nitroglycerin. During the past year he has had but one attack, and that after over-exercise of skating last winter. This is surely a reflex heart syncope.

The following two cases are from Dr. J. Madison Taylor's clinic at the Howard Hospital:

CASE IV. E. H., mulatto aged seventeen years, milliner, reported

August 12, 1899, complaining of frontal headache for several months (since hot weather began). Her eyegrounds were negative. Dr. William Campbell Posey also reported partial reversal of her color-fields. Patient gives a history of "fainting spells" for past six years. Says she has had but two convulsions during that time, and persists she was unconscious in them. Says she is unconscious in some of the spells she now complains of. She was hysteroneurasthenic and anæmic (r. b. c., 3,500,000). The patient was placed on pil Bland, gr. v. t. d. semi-rest treatment and sodium bromide, gr. x at bed time. She has had no attack for the past six months. It is possible this girl has epilepsy and hysteria combined. She has much improved in general health as well. It is an obscure case, but I am tempted to eliminate epilepsy entirely.

CASE V. Miss R., aged twenty-two years, a rather refined white girl, a seamstress. She has a younger sister treating at the "clinic" for grand-mal. The mother told me of this older sister having "fainting spells," so that I sent for her to report to the hospital. She had paid no attention to these. She was in a neurasthenic state from worrying over the condition of her sister. She was very anæmic and constipated. I have not seen her in a fainting spell. Her mother persists she is not unconscious in many of them. Treatment of the anæmia and constipation have much lessened her attacks. The heart failure attacks may be hysterical, due to subconscious suggestion, or may be the precursor of an epilepsy in (from the family history) a favorable subject.

HYSTERICAL SYNCOPE.

CASE VI. E. W., female, white, Hebrew, seamstress, reported to the Medico-Chirurgical College, August 24, 1900. She complains of general nervousness, and of attacks in which the face becomes pale. She then becomes semi-conscious and "faints away," lasting momentarily. There is no rigidity or movements in the extremities. After an attack she has "severe" pain in the præcordia. Does not sleep after an attack. On questioning the other day, I ascertained she had two convulsions about two years ago. Her skin is muddy. There is no cardiac murmur. There is accentuation of the second aortic sound. Dr. John B. Deaver has diagnosed a floating kidney to be present. Urine is negative.

CONCLUSIONS.

I beg to present the following points in conclusion as to early recognition of the significance of syncope in the subject under discussion. There is, in a minority of cases of "heart failure," so called, difficulty

of discerning the true origin of the cardiac symptoms. Organic heart disease would be a sign, in a difficult case with a comatose mental state during the spell, that the syncope was entirely of cardiac origin. Rarely is organic disease of the heart the cause of convulsions unless due to emboli, in which case paralysis or death generally follows the spasms. The less frequent and variable the apparent unconsciousness during an attack of syncope, the more likely the hysteroid nature. The condition in children is most difficult of diagnosis. The presence of a slow, full and irregular pulse, with or even without unconsciousness, the more likely the epileptoid nature of the case. Leaky skin and cold extremities are more in favor of hystero-anæmic cases. The absence of pain in any case eliminates angina. Cyanosis is not common, except in the organic heart cases. A tendency to rigidity without convulsion is in favor of hysteria being the background of the clinical picture.

A New Aseptic Ether and Chloroform Inhaler.

BY ERNEST LAPLACE, M.D.

[Read October 10, 1900.]

My object in presenting to the attention of the Society this new inhaler, which I have devised, is to demonstrate the following points of excellence which it possesses. It consists of two oval hemispheres, superimposed, bound together at the broader extremity by a hinge, and clasped by a clamp at the smaller extremity. The outer half is made of hard metal, containing a crucial opening, through which the anæsthetic is poured. The inner sphere is made of wire gauze netting. Between these two hemispheres is introduced a sufficient amount of cheese cloth to fill the intervening space—the two hemispheres are closed, and clamped. The inhaler is immediately ready for use—in the administration of ether. A small trough exists around the base of the apparatus, to catch any surplus of ether.

For the administration of chloroform, only one or two pieces of cheese cloth are introduced between the hemispheres, thus allowing a very free circulation of air.

The special advantages of this inhaler are :

1. Its simplicity of construction.
2. The rapidity and facility with which it is prepared for use.
3. It is thoroughly aseptic. The instrument may be sterilized by

heat before use. Sterilized gauze or cheese cloth is then readily placed between the hemispheres, completing its preparation.

The facility of this procedure enables a perfectly clean and sterile inhaler to be used at each operation, giving the inhaler the requirements exacted by modern aseptic surgery, as well as expedition in its preparation for use.

It is manufactured by the Kny Scheerer Co., of New York.

DISCUSSION.

DR. E. W. HOLMES said, there is a difference in ideas relative to etherization, some holding that there is need to exclude the air and to give saturated ether. He believes in giving air saturated with ether, and in giving chloroform with a great deal of air.

In the Allis inhaler there is perfection of method, but not of details. The careless anaesthetizer will take the Allis inhaler from one patient to another without proper antiseptic precautions. It also takes considerable time to prepare an Allis inhaler. The only proper way is to have a number of them sterilized and ready for use. There is still a need for a perfect inhaler.

The closed method referred to by Dr. Laplace is much more dangerous than that used with the Allis instrument, by which the patient is given all the air he can take with the ether itself. To Dr. Holmes the closed method seemed a step backward. One advantage claimed by Dr. Laplace is the ease with which the cotton can be changed. This is not such an advantage since the whole instrument has to be sterilized before being used upon the second patient. It seems conclusive that the only solution is to have a number of inhalers ready on a shelf. One disadvantage is that it is a very heavy instrument. That, however, would be an advantage if there were occasion to use it sometimes as a means of defence. The defects in the Allis inhaler do not overcome the greater advantages of carrying out a proper method in etherization.

DR. LAPLACE in closing the discussion said: This inhaler could be used just as easily for chloroform, by putting in only a couple of layers of gauze. The Allis inhaler is a convenient instrument, but it has defects which Dr. Laplace tried to remedy in his own instrument which he has used for a year, and it answers very well and anaesthetizes as quickly as the Allis inhaler.

It was not meant by Dr. Laplace that suffocation should be resorted to, but there are times when it is necessary to put a towel over the Allis inhaler in order to cut off the air. In Dr. Laplace's inhaler the air can be let in or cut off according to one's judgment of the necessity of the case. The same principles exist here as in administering ether under any other circumstances. The gauze is saturated with ether; if the patient is not apparently receiving enough air, the crucial opening should be uncovered, or the inhaler lifted from the face; if less air is desirable, the inhaler can be fitted closely over the face. The necessity of each case must decide the quantity of air admitted.

Demonstration of a New Hæmoglobinometer.

BY ARTHUR DARE, M.D.

[Read, by invitation, October 24, 1900.]

I am indebted to our honorable President, Dr. Musser, for the suggestion that affords me the privilege of showing you a new instrument for measuring the amount of hæmoglobin in blood. The application of the instrument differs from that operative in the popular instruments of Von Fleischl, Gowers, and Oliver, by using blood unmixed with artificial serums. The advantages of this method will become obvious I trust when the mechanism and operation of the instrument, which we will briefly study, are demonstrated.

The instrument consists essentially of an automatic pipette for collecting the blood, and a graduated color comparison to measure the percentage of hæmoglobin therein contained. The pipette for collecting the blood is composed of an oblong plate of white or opal glass into the end of which is ground a depressed surface exactly parallel with its plane surface, and of measured depth. This depression forms a very shallow capillary chamber when the transparent glass is placed over it and the two are clamped tightly together with a pipette-clamp. This space fills automatically by capillary attraction when either of the three free edges is touched lightly to the blood drop. When filled, the pipette is placed upon the stage of the instrument and held in position by grooves, and is then compared with a color comparison composed of a semi-circle of tinted glass, the periphery of which represents an increasing shade of color from apex to base. This is secured to a disk of opal glass which serves the same purpose as in the pipette, disperses the light and furnishes a white background against which the color shades are best appreciated.

The blood and comparison placed horizontally side by side are viewed through achromatic lenses fitted into the telescoping camera tube, and the comparison adjusted by means of a milled head which in turn rotates the color prism until the same corresponds in color with the blood. The hæmoglobin percentage is then read off, and the examination is at an end.

As the examination only consists of filling the pipette and comparing the color shade with the comparison, the time required for an observation is reduced to the minimum one or two minutes, which places hæmoglobin estimation among the practical clinical methods.

We will consider the instrument from the aspect of the scientific hæmatologist.

By using a stratum of blood the thickness of which is always constant, we avoid the volumetric character of all dilution methods. It is evident that if the ends of the column of blood contained by dilution pipettes are either concave or convex, or if the outside is soiled, an error must result. As the blood film is viewed against an illuminated opaque white background, leucocytosis is imperceptible, only the red color of the hæmoglobin is visible.

With the Fleischl the error due to leucocytosis is considerable as the blood and water mixture is turbid, and does not compare with the clear tone of the color comparison, making the readings low, while in leucopenia they are high.

Again, by using undiluted blood we avoid the dilution color curve, to illustrate: an equal volume or weight of normal 100 per cent. blood and water, instead of reading 50 per cent. reads 65 per cent., this discrepancy is the color curve. In every different sample of blood which is an intravascular dilution, we have a color curve due to different degrees of hæmoglobin concentration, this color curve is even adjusted by keeping an equal concentration of coloring matter in the blood film and color comparison, e. g.

Blood reading 100 per cent. requires greater concentration of color, hence a thicker stratum of colored glass to give an equal shade, than a film containing 20 per cent. of hæmoglobin.

We keep the focal distance of all observations uniform by using achromatic lenses and a fixed camera tube and obtain a large field from apertures that cover only 3 per cent. of the comparison disk, against 20 per cent. in the Fleischl. We also have darker shades to compare, an operation less difficult than with delicate tints.

The instrument can be used in daylight by directing the line of vision toward a dark surface, as a black coat that does not reflect light. I frequently use it in the hospital wards where the brightness of daylight is intensified by the whiteness of walls and linen.

If the colors do not look alike daylight either direct or reflected is entering beside the candle flame, the yellow light of which only in a measure occludes the violet rays of the solar spectrum.

DISCUSSION.

DR. J. ALISON SCOTT said he wished to speak in commendation of this instrument. He had not had much opportunity of working with it, owing to the demand there is at present for it. There is unquestionably a great necessity for a hæmoglobinometer that is comparatively inexpensive. The method of Hammerschlag—that of using fluids—to determine the specific

gravity of the blood drop—for use in office work is not satisfactory. Von Fleischl's is too expensive, and the apparatus devised by Oliver in England is so much more expensive than von Fleischl's, that it seems almost impossible to secure an apparatus within the means of the practitioner. Dr. Dare sometime ago showed this instrument to Dr. Scott, and it seemed to him to have this advantage over von Fleischl's and Oliver's, it uses the blood itself without any dilution. The most difficult point in the estimation of hæmoglobin is in the reading of the low grades, the high grades being comparatively easily estimated. With the von Fleischl instrument it is my custom to take two or three pipettes and divide the results by two or three in order to estimate approximately the low grades of hæmoglobin. The instrument of Dr. Dare is valuable because of the ease with which it reads the lower grades of hæmoglobin.

DR. F. M. PERKINS asked the cost of Dr. Dare's instrument at the market price.

DR. DARE replied \$15, and added that 500 comparative examinations with the instruments of von Fleischl, Oliver, and Dare show readings always very close to the Oliver. With the von Fleischl the results are at variance in low hæmoglobin percentages, in leukæmic blood, and in blood showing leucocytosis.

A Brief Account of a Visit to Professor Finsen's Light Institute at Copenhagen.

[ABSTRACT.]

BY HENRY W. STELWAGON, M.D.

[Read October 24, 1900.]

The Finsen concentrated light treatment is based upon the fact that the chemical rays are destructive to bacterial life. Experiments had been made by Finsen, as well as by others, which had established the truth of this. The difficulty was to get rid of the troublesome heat rays, which were without special value, and yet not to shut off the chemical rays. This has finally been accomplished in the sunlight apparatus by filtering the light through an ammoniacal solution of copper sulphate, and in the electric light apparatus by filtering the light through distilled water contained in the lens tube; and further in both plans by holding on the part under treatment a hollow glass disk, through which cool water is kept circulating; the rays being projected through the disk. This disk also serves another object; it is pressed down on the skin and presses the red blood from the part, the

red blood having been found to offer obstruction to the deep penetration of the chemical rays.

Finsen found that the results of the light treatment in lupus vulgaris—tuberculosis of the skin—were promising, and the treatment of this disease was then begun in a systematic way. An institute for this purpose has been established at Copenhagen. Although the buildings for the electric light treatment are crude and unpretentious, a large number of cases have been so far under treatment, and with satisfactory final results. There are five arc lights, each arranged so that four patients can be treated at the same time at the one lamp, making twenty under treatment at the one time. The patients have become so numerous that these lamps are in use the entire day. Each patient is attended by a nurse who aids and supervises the proper application of the rays. In sunshiny weather the arc lights are dispensed with, and the treatment given out of doors, the sunlight being utilized for the purpose; concentrated by means of lenses. But a small area can be treated at the one application, so that, in an average case, some time elapses before the whole diseased surface is gone over. One or two repetitions may be necessary. The results are satisfactory but, as may be inferred, the treatment is slow, in average cases from six to eight months, usually with a daily application of one hour's duration.

New and larger buildings will soon be erected and give greater facilities for treating an increased number of patients. At present the facilities are entirely inadequate to accommodate the applicants. The method has now been in public use for about three years, and has made a favorable impression upon all medical visitors, so that the apparatus is gradually finding its way to other countries. It is hoped soon to have a sunlight apparatus in operation at the Howard Hospital in this city, and later if the results and clientele justify it, the more expensive electric light apparatus.

DISCUSSION.

DR. M. B. HARTZELL said it must be generally admitted that this method of treatment is effective, and that a certain proportion of cures has been produced; but those who have followed the accounts of these cases have been struck by the fact that in lupus of the mucous membrane, in which the electric light treatment is not used, the cure takes place as rapidly as in cases in which the electric light is employed. In most, if not in all, cases the light treatment is supplemented by the use of applications, such as pyrogallic acid and tincture of iodine. So that while the electric light treatment alone may be sufficient to produce cure, yet it is not held by Professor Finsen as being

sufficient in all cases, since he regards other applications as an essential aid. The question, therefore, arises whether the electric light accomplishes anything more than can be accomplished by the other methods of treatment now in vogue. As Dr. Stelwagon has said, there must be a suspicion in the minds of all who have followed out the subject, that if more attention were paid to detail and a more prolonged treatment given with other methods, extending perhaps over a year, the same striking results might be achieved. It is apparent that concentrated light has a very beneficial effect in these cases, and perhaps the results obtained as to cosmetic effect are superior to some other methods, but when expense attending the treatment is considered and the length of time necessary, it may be a question whether this treatment offers the advantages which have been claimed for it.

PROFESSOR HOUSTON said he was unexpectedly brought to the meeting by his friend, Dr. Daland, who, in answer to inquiry, assured him he would understand a word here and there. Sure enough, the subject interested him much. At one time he spent a large part of the working hours of the day in the study of illumination by the arc light in connection with his work in the Thomson-Houston Electric Light Company. He is quite convinced that there is some physiological effect produced by the arc light, but whether that be the effect of the light alone, or the effect of the large quantity of ozone always generated by the arc light, or both, he could not say. The genial effect produced by that form of radiant energy of the sun, called light is well known, although, possibly, some little of this effect is due to the admixture of the X-rays with the light rays. Whatever this effect be, the result is that it is a pleasant thing to work in sunshine, just as it is pleasant to work in the neighborhood of the arc light. In the early development of the arc light, in adjusting the lamps it was customary to set up a number of lamps in the form of a hollow rectangle, the person regulating them being stationed within the rectangle. Whatever therapeutic power there be in such radiation, and he believed there is considerable, would be apt to affect the person working under these circumstances. He never found working with the arc light as tiresome as other work, though he always attributed this at least partly to the ozone generated, for an arc light in good working order will produce considerable ozone.

A short time ago, while in Canada, he had the pleasure of meeting Lieutenant-General Sir Henry Wilkinson, at one time commander of a large part of the British Army, who related some experiments which he, when on duty in India, had made with sunlight as a germicide at a time when cholera was prevalent and it was difficult to obtain pure drinking water for the soldiers. He tried repeated filtration unsuccessfully and found that the best way of sterilizing the water, as proved by actual cultures, was in having a stream of water less than one-quarter of an inch thick flow over the part of a wall exposed to full sunshine. He assured Professor Houston that experts failed to find any bacilli in the water so sterilized by sunlight, and added that many of the soldiers troubled with various diseases were helped much by sun baths.

Professor Houston suggested that experiments of this kind are largely influenced by the fact that under the circumstances the patient is perhaps forced to be a little more cleanly and is more inclined to observe hygienic rules than usual, but of course, he added, that as a non-expert he recognized that his opinion must be taken with no little reserve.

DR. STELWAGON closing the discussion said he thought the criticism made by Dr. Hartzell a just one. Reference is made to this point in the paper. The method of treatment has not as yet an established place; and its value and practicability as compared with other methods have yet to be proven, more especially as regards relapses. It is true that lupus of the mucous membrane in Finsen's cases is treated by the ordinary methods, and it is probable, if the patients would submit to treatment of the cutaneous lesions as long and diligently as they seem to be willing to do with the light method, equally as satisfactory results could be obtained. Unfortunately the majority of patients will not submit to painful methods of treating cutaneous tuberculosis, and the practical painlessness of the light method is its strong feature. Its novelty is also an unquestionable attraction.

The long duration of the plan is its greatest drawback, but it is probable with improved apparatus the time may in the future be considerably shortened. The study of the therapeutic value of light is in its infancy. As bearing on this point, I recall two cases of extensive psoriasis in which the patients for a time during their work kept their arms bared to the elbow, and in both cases where the lesions were exposed to light the improvement was much more rapid than on covered parts. The discovery of the X-ray with its demonstrated power of penetration, and later its value in certain diseases, and the admitted value of the Finsen method in treating lupus, lead me to believe that we may have in concentrated light a therapeutic agent of considerable importance.

Some Anomalous Cases of Typhoid Fever.

BY AUGUSTUS A. ESHNER, M.D.

[Read October 24, 1900.]

In any community provided with a water supply constantly exposed to the danger of contamination, cases of typhoid fever will always occur, and while perhaps no other disease is as common or as well known, the clinician must ever be on the alert lest he overlook mild or anomalous cases or mistake for typhoid other diseases that simulate it. The possibility of confusion is not diminished by the fact that typhoid fever is exceptionally unattended with elevation of temperature, nor that the disease is at times unassociated with intestinal lesions. The liability to error has, however, been much reduced in recent years through the

employment of the Gruber-Widal serum-test, which, although it may be considered the most trustworthy among the diagnostic phenomena of typhoid fever, on the one hand cannot be relied upon at an early stage of the disease, and occasionally fails to yield a positive reaction in genuine cases, while on the other hand a positive reaction may be due to an earlier attack of typhoid unnoticed or forgotten. Even in the absence of the blood-serum reaction it seems yet permissible, though obviously not entirely safe, in temperate climates, to consider as typhoid any continued fever not explicable upon other grounds. The symptoms of the disease will necessarily vary with the degree of virulence of the typhoid-bacilli on the one hand, and the degree of susceptibility or immunity of the infected individual on the other hand. The following cases are briefly reported for the purpose of evoking discussion and a recital of personal experience. The first two are noteworthy for the striking contrast with each other they exhibit, the one being extremely severe and the other unusually mild.

CASE I. An unmarried woman, thirty-eight years old, was admitted to the Philadelphia Polyclinic August 22, 1899, after a week's illness attended with fever, diarrhœa and delirium. She had just come from Atlantic City, where she had been but a short time, and was on her way home to Long Island, whither she had been sent on account of her illness. She had previously been in Washington. Her temperature was 104.8° , the pulse 104, the respirations 28. Her face was flushed and presented a dull, heavy expression. Sordes were present on the teeth, and the tongue was covered with a brownish crust. The abdomen was soft; the spleen enlarged. Heart and liver exhibited no abnormality. No rose-spots could be discovered at this time, although they appeared a little later. The patient was in a state of profound depression, with muttering delirium. The urine, examined in the course of a day or two, was found free from albumin and sugar, containing a small amount of indican and yielding the diazo-reaction; and the blood responded positively to the Gruber-Widal test. Tub-bathing was at once begun in water at a temperature of 68° F. for ten minutes whenever the temperature in the rectum reached 102.2° , and half an ounce of whiskey was given before and after each bath. An ice-bag was applied to the head and one to the abdomen, and one-thirtieth grain of strychnin was administered every three hours, together with peptonized milk every two hours. The temperature persisted at its high level. The bowels moved involuntarily and the bladder was catheterized on account of failure to void urine normally. On the twenty-third day after admission blood was observed in the stools, and the baths were

suspended temporarily, being replaced by sponging with dilute alcohol. Later in the day a hemorrhage of six ounces, and subsequently a second of sixteen ounces, took place from the bowel. Morphin, one-quarter grain, and ergotin, one-half grain, were given hypodermatically. On August 25th, sponging for twenty minutes was begun when the temperature was above 102° . Tub-bathing was, however, resumed on the 29th, and was continued as required until September 13th. Sixty tubs and forty-four sponges in all were given.

The temperature did not begin to waver until August 30th. On September 1st it fell below 99° , and thereafter it continued irregularly until September 4th, when again it reached the 103° level, continuing somewhat irregularly thereabouts until October 2d, when it once more began to decline; but it did not reach the normal to remain there until November 13th. Cough was a troublesome symptom from the beginning, but only signs of bronchitis could be discovered until about September 11th, when signs of pneumonia at the base of the left lung appeared, with rusty sputum containing diplococci, but no tubercle-bacilli, and after a few days also signs of pleurisy. This condition yielded with extreme reluctance. It was thought the period between September 2d and 15th was occupied by a relapse. On October 10th the urine contained albumin and hyaline and granular tube-casts; and on the 24th a slight trace of albumin, but no casts, and it yielded the diazo-reaction. On the 12th the blood responded positively to the Gruber-Widal test. The patient was discharged November 26th, completely recovered.

The intoxication in this case was evidently most profound, delirium, restlessness, tremulousness, sleeplessness, and nausea being marked features. For a time perforation of the bowel was feared, and the services of a surgeon were held in readiness for needed intervention at a moment's notice. Oxygen-inhalations were employed for a part of the night of August 26th and the morning of August 27th.

CASE II. A driver, thirty years old, was admitted to the Polyclinic Hospital September 5, 1899, on account of a fracture of the fibula, which received appropriate treatment and pursued an uncomplicated course. The temperature was 100.6° on admission, and continued at this level for a week, when it rose to a slightly higher plane, ranging between 101° and 103° , in the neighborhood of which it continued for ten days, when it began gradually to decline, reaching the normal on the twenty-fifth day, and so remaining. Throughout all of this period the patient was perfectly comfortable and made no complaint whatever. The urine was found free from albumin and sugar, and on September

18th it failed to yield the diazo-reaction, although this was found present subsequently on September 19th and October 6th, 12th, and 17th. No malarial plasmodia were found in the blood, but a positive reaction to the Gruber-Widal test was obtained on September 16th and 18th, and again on the 22d. On September 18th there had been nose-bleed, the spleen was found enlarged, and rose-spots were detected upon the abdomen. The patient was dismissed perfectly well on October 24th.

The original rise of temperature in this case was attributed to the traumatism inflicted, together with the consequent disturbances attendant upon the fracture, particularly as the general condition was so slightly affected as not to attract the attention of the patient, whose diet had thus far not been specially restricted. The persistence of the pyrexia, however, together with the development of the remaining symptoms, left no doubt as to the diagnosis, although it cannot be asserted with certainty whether or not the patient was suffering from typhoid fever on admission. The case is noteworthy only for the extreme mildness of the constitutional manifestations throughout.

The next two cases are interesting by reason of their hemorrhagic character. They are to be reported in detail at a later date.

CASE III. A heavy drinker, thirty-nine years old, was admitted to the Philadelphia Hospital July 13, 1900, in a delirious state, after an illness of three weeks' duration, which the symptoms indicated to be typhoid fever. In the course of a few days a hemorrhagic eruption appeared all over the body; the urine became bloody and hemorrhage from the bowel took place. Death resulted and blood was found in the peritoneal, pleural and pericardial cavities; in the stomach and intestines; in the bladder, the lungs, the kidneys and their pelves, the adrenal bodies and the pancreas. The ileum, besides, was the seat of typhoid ulceration.

CASE IV. A laborer, twenty-eight years old, was admitted to the Philadelphia Hospital on July 14, 1900, with symptoms of typhoid fever. Five days later a petechial eruption appeared on the chest and the abdomen and persisted for several days. Death took place on the eighth day of observation, and post-mortem examination disclosed the existence of typhoid ulceration of the intestines.

The next case that I shall report I believe to have been one of typhoid fever without intestinal lesion. I was, unfortunately, unable to secure permission for an autopsy, and cannot, therefore, verify the correctness of the diagnosis, which was based upon the presence of the Gruber-Widal reaction and the total absence of intestinal symptoms.

CASE V. I was called on August 18, 1900, to see a young man, nineteen years old, who had been employed as a waiter and had complained of headache and weakness for a few days. Other than elevation of temperature, and slight roughness of breathing, no objective abnormality could be detected, and apart from a few rose-spots and slight enlargement of the spleen, nothing special developed in the further course of the case. On August 20th, 24th, and 27th the blood failed to yield the Widal reaction; on September 6th clumping was present and an incomplete reaction was obtained; finally, on September 9th, the reaction was complete and immediate. Death took place on September 12th from progressive asthenia.

A considerable number of cases of typhoid fever without intestinal lesions have now been reported, and such a diagnosis seems entirely legitimate. Of course, the recognition, as well after death as during life, is possible only by bacteriological methods, and is to be based upon the presence of typhoid-bacilli in the intestinal discharges or contents or in blood from the spleen, or upon a positive response of the blood to the Gruber-Widal test. When it is reflected that infection with other micro-organisms is not confined to a single viscus, it should not occasion surprise that infection with typhoid-bacilli should not be confined to the intestine, and it may safely be concluded, I think, that no organ or tissue exhibits a specific predisposition to infection with any one micro-organism. There is, thus, justification for the view that typhoid fever is not inherently an intestinal disorder. That it is so in the vast majority of cases may be due to the mode of infection.

The difficulty in the differentiation between typhoid fever and acute miliary tuberculosis is perfectly well known, the latter disease being the more often mistaken for the former. I have elsewhere dwelt upon the differential diagnosis of these two diseases in connection with the report of a probable case of miliary tuberculosis simulating typhoid fever.¹ I recall distinctly, however, the case of a boy at the Philadelphia Hospital during the past summer, who presented symptoms that led me at first to make a diagnosis of miliary tuberculosis as against typhoid fever, but in which, as the disease developed, it became perfectly clear that the latter was the condition really present.

I have within a few days seen a woman in whom premature delivery resulted, perhaps partly in consequence of an attack of malarial intermittent fever, and partly in consequence of the large doses of quinin administered, who after an uncomplicated labor, without puerperal in-

¹ International Medical Magazine, February 15, 1898.

fection, developed symptoms of typhoid fever, at the conclusion of which those of intermittent fever reappeared, and these in turn yielded to the administration of quinin.

I wish, finally, to make brief reference to two cases previously reported, in which typhoid fever coexisted with two other infections. In one of these typhoid fever developed in a syphilitic subject presenting also symptoms of pulmonary tuberculosis;¹ in the other typhoid fever developed in the course of pulmonary tuberculosis and was complicated by pneumonia.²

The Disinfection of Infected Typhoid Urines.

BY NORMAN B. GWYN, M.B.

[Read, by invitation, October 24, 1900.]

In previous communications I have spoken more fully on the presence of typhoid bacilli in the urines of typhoid fever patients.³ Let me briefly review the work which seems to make imperative the disinfection of all such urines, unless proved bacteria free by careful bacteriological examination. As early as 1881 Bouchard claimed to have isolated typhoid bacilli from the urines of 50 per cent. of cases of typhoid fever; other writers, Hueppe, Seitz, Konjajeff, Karlinski, Neumann, Borges, de la Faille, gave less alarming but positive results. Blumer, Wright, Besson, and Petruschky confirmed the work of the earlier workers, while T. R. Brown, Houston, Horton Smith, Richardson and myself have contributed to the subject within the last two years. In this country Richardson's important collection of twenty-five cases, and my own of ten show how frequently typhoid bacteriuria may occur.

The general conclusions deducible from most recent investigations may be thus tabulated:

I. In from 20 to 30 per cent. of cases of typhoid fever typhoid bacilli may be present in the urine.

II. When present they are usually in pure culture and may be so numerous that the urine is turbid when freshly voided, one of Petruschky's cases showing 170,000,000 bacilli in 1 c.c. of urine; one of our own showing 500,000,000 per c.c.

¹ Philadelphia Medical Journal, March 25, 1899.

² American Journal of the Medical Sciences, July, 1899.

³ Bulletin of Johns Hopkins Hospital, 1899; Philadelphia Medical Journal, March 3, 1900.

III. Appearing generally in the second and third week of illness, the organisms may persist for months or years. In Houston's case the bacilli had been for three years in the bladder; in one of our own, bacilli were found in the bladder three and five years subsequent to the attack of typhoid fever.

IV. Though often showing evidences of cystitis and marked renal involvement, the urine containing bacilli has usually only the characteristics of a simple febrile urine, the presence of the bacilli has no prognostic import, and they may persist for some time without causing local change, multiplying in the urine which remains persistently acid.

The danger of infection from infected typhoid urine must be clearly evident from these facts, if one but remembers that a few drops carelessly spilt may mean, and often does mean the distribution of millions of typhoid bacilli. The daily number voided in cases in which 170 or 500,000,000 organisms are present in a cubic centimetre, is beyond comprehension.

It is more than probable that urine, by reason of its apparent harmlessness, plays and has played the most important part in the spread of typhoid fever, and, unless, we can prove that a patient's urine is free from infectious material, we commit a great folly in letting it be disposed of without disinfecting it, especially when we systematically disinfect the feces in which the number of typhoid bacilli is small as compared to the number in the urine. When we consider also that many cases may go on distributing the millions of bacilli daily for months and sometimes as in the above-mentioned cases for years, the seriousness of the problem is apparent.

Recently, I have investigated the ordinary methods of disinfecting excreta, endeavoring to ascertain the minimum amount of disinfectant necessary for complete disinfection of the urine, and as far as possible the shortest time in which this minimum amount might be effective.

INVESTIGATION OF DISINFECTANTS.

Urine collected sterile, or urine sterilized by heat, in measured quantities of 10 c.c. was employed. It will not be out of place to mention that not all urines form suitable media for the growth of the typhoid bacillus; in one acid albuminous urine the organism grew extremely tardily, presenting many diplobacillus-like or diplococcus-like forms and losing its motility temporarily. The growth of the organism in urine, as in bouillon, is productive of a well-marked alkaline reaction, after the first slight acidification; the constant acidity spoken of in

typhoid bacteriurias is probably due to the continual removal of the urines from the bladder before an alkali is formed.

Disinfection as used in this note will refer principally to freshly voided acid urines.

The principal disinfectants at present in use in hospitals and practice are: milk of lime, carbolic acid, bichloride of mercury, formaldehyde, chlorinated lime and liquid chlorides; these will be considered in this order.

Milk of lime, made by slaking or dissolving ordinary builder's lime in water, enough being used to make a heavy sediment (which must be shaken up and used with the solution), is the cheapest disinfectant; it is, however, neither rapid nor certain, and to obtain results at all satisfactory one must use a solution so concentrated that on standing it will precipitate half its actual volume of lime.

With such a solution, 10 c.c. of infected urine were disinfected by 4-5 c.c. of milk of lime in 2½ hours. A precipitate 2½-3 cm. deep of lime forms in such experiments. Yet living bacilli could be obtained from the tubes after 1-2 hours. Smaller quantities of this solution require 4-6 hours for complete disinfection, while with the ordinary hospital solution 10 c.c. of infected urine were disinfected by 10 c.c. milk of lime in 4 hours. One cannot well use a greater amount of disinfectant than this, which means that, according to the strength of the solution, 600 or 1200 c.c. of milk of lime must be taken to completely disinfect a daily amount of urine of say 1200 c.c., and that only after 2-4 hours.

1200 c.c. infected urine would require 600-1200 c.c. of milk of lime solutions for complete disinfection within 2 to 4 hours.

Carbolic acid was found to be of value only in large amount or very strong solution. The 1-20, 1-40, 1-100 solutions were used.

- 1 c.c. of 1-20 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-200 had only inhibitory effect on organism.
- 2 c.c. of 1-20 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-120 is effective in 2 hours.
- 3 c.c. of 1-20 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-85 is effective in 1 hour.
- 4 c.c. of 1-20 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-70 is effective in 5 minutes.
- 5 c.c. of 1-20 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-60 is effective in ¾ to 1 minute.
- 4 c.c. of 1-40 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-140 is effective in 1 hour.
- 5 c.c. of 1-40 carb. ac. in 10 c.c. infected urine making a dilution of carbolic of 1-120 is effective in 15 min. to ¾ hour.

The 1-40 solutions apparently possess a greater and more rapid disinfectant action than 1-20 solutions (compare the final dilutions of No.

2 of 1-40 with No. 2 of 1-20); the greater amount of substance added, and perhaps the greater diffusibility of the solution, may account for the difference:

Of 1-100 solution, an amount equal to that of the infected urine is required for disinfection in $\frac{1}{4}$ -1 hour.

From these experiments one sees that carbolic acid is only effective in strong solution and large amounts:

A daily amount of infected urine of 1200 c.c. would require—

360-400 c.c. of 1-20 solution carbolic	} for complete disinfection within 1 hour.
480 c.c. of 1-40 " "	
1200 c.c. of 1-100 " "	

Bichloride of mercury.—In contrast to these two substances is the action of bichloride of mercury, which in the urine is both a powerful and rapid disinfecting agent.

The 1-1000 solution, as being most commonly used, was first tried.

1. 2 c.c. of 1-1000 HgCl_2 solution in 10 c.c. infected urine, making a solution of HgCl_2 of 1-5000 is effective in 1 minute.
2. 1 c.c. of 1-1000 HgCl_2 solution in 10 c.c. infected urine, making a solution of HgCl_2 of 1-10,000 is effective in 15 minutes.
3. $\frac{1}{2}$ c.c. of 1-1000 HgCl_2 solution in 10 c.c. infected urine, making a solution of HgCl_2 of 1-20,000 is effective in $\frac{1}{4}$ hour.
4. $\frac{1}{4}$ c.c. of 1-1000 HgCl_2 solution in 10 c.c. infected urine, making a solution of HgCl_2 of 1-40,000 is effective in 1 hour.
5. 2 c.c. of 1-2000 HgCl_2 solution in 10 c.c. infected urine, making a solution of HgCl_2 of 1-10,000 is effective in 15 to 30 minutes, corresponding practically to No. 2 of the 1-1000 series.

In further experiments with HgCl_2 it was readily proven that when the strength of the HgCl_2 in the mixture of urine and solution was between 1-5000 and 1-40,000, disinfection was complete within an hour and compared closely with the results in the 1-1000 series. When the strength ranged from 1-50,000 to 1-100,000, 1 $\frac{1}{2}$ -3 hours were necessary for complete disinfection.

10 c.c. of 1-40,000 or 1-50,000 HgCl_2 in 10 c.c. infected urines, making a solution of 1-80,000 or 1-100,000 is effective in 2 to 3 hours.

Beyond these amounts HgCl_2 would hardly be employed. One can readily calculate the amount of any solution necessary for disinfection by comparing with above results. The experiments further allow us to infer as follows:

- 1 gramme of HgCl_2 in 5000 c.c. of urine would be immediately effective, if it could be immediately dissolved.
- 1 gramme of HgCl_2 in 10,000 c.c. of urine would be effective in 15 minutes, if it could be immediately dissolved.
- 1 gramme of HgCl_2 in 20,000 c.c. of urine would be effective in $\frac{1}{2}$ hour, if it could be immediately dissolved.
- 1 gramme of HgCl_2 in 40,000 c.c. of urine would be effective in 1 hour, if it could be immediately dissolved.

The power of HgCl_2 can be judged from the above results. The expense is almost offset by the small amount of the substance required; in addition, it is a clean, odorless and easily applied disinfectant if prepared in solution.

Comparing bichloride of mercury with carbolic acid, we can estimate that—

1200 c.c. of urine would require	120 c.c. of 1-1000 bichloride solution	For complete disinfection in 15 minutes.
	60 c.c. of 1-500 " "	
	30 c.c. of 1-250 " "	
	15 c.c. of 1-125 " "	
1200 c.c. of urine would require	60 c.c. 1-1000 for disinfection in $\frac{1}{2}$ hour.	
1200 c.c. " " " "	30 c.c. 1-1000 " " " 1 "	

Formaldehyde was found a fairly efficient disinfecting agent; its expense, however, precludes its use, except in a very dilute solution. It is usually procured in the strength of 40 per cent., which is given the value of 100 or full strength, and its dilutions are reckoned accordingly.

One per cent. formalin is really 1-250 instead of 1-100.

5 c.c. of 1 per cent. formalin	were required to disinfect 10 c.c. urine in $\frac{1}{2}$ to 1 hour.
3 c.c. of 5 " " " "	10 c. " $\frac{1}{4}$ to 1 "
1 c.c. of 10 " " " "	10 c. " $\frac{1}{2}$ hour.
6 c.c. of 1 " " " "	10 c. " 5 to 10 minutes.
4 c.c. of 5 " " " "	10 c. " 5 to 10 "
2 c.c. of 10 " " " "	10 c. " 5 minutes.

As compared with preceding substances,

1200 c.c. urine would require	600 c.c. of 1 per cent. formalin for disinfection in	$\frac{1}{2}$ to 1 hour.
	300 c.c. of 5 " " " "	$\frac{1}{2}$ to 1 "
	120 c.c. of 10 " " " "	$\frac{1}{2}$ to 1 "
	240 c.c. of 10 per cent. formalin for disinfection in	5 minutes.
	720 c.c. of 1 " " " "	5 "
	480 c.c. of 5 " " " "	5 "

Chlorinated lime, applied by making a saturated solution and using the supernatant fluid, is one of the most reliable disinfecting agents. Free chlorine is evolved when mixed with urine, particularly if the urine is acid. No distinct difference in the disinfecting power could, however, be detected in neutral or slightly alkaline urines, in both of which chlorine was evolved, although distinctly less than in the acid urines. The reaction seemed to be instantaneous in all experiments.

10 c.c.	} Chlorinated lime solution in 10 c.c. infected urine disinfects in from few seconds to 1 minute.
5 c.c.	
3 c.c.	
2 c.c.	
1 c.c.	
$\frac{1}{2}$ c.c.	
$\frac{1}{4}$ c.c.	

It is hardly practicable to use smaller quantities than this; in disinfecting large quantities enough solution to produce a distinct reaction

should be used; the evolution of chlorine and the bubbling over which ensues might be inconvenient where large quantities of acid urine are to be disinfected.

1200 c.c. of urine would require 30 c.c. of chlorinated lime solution for complete and immediate disinfection.

The liquid chlorides, a mixture of chlorides of zinc, aluminium and copper, are much used and are very efficient. A heavy precipitate occurs when they are added to urine, due probably to the throwing down of the sulphates; it may vary in different urines, and was most marked in those of distinct acid reaction.

1 c.c. liquid chloride in	10 c.c. infected urine	disinfects in 1 hour.
2 c.c. " "	10 c.c. " "	" " " $\frac{1}{4}$ "
3 c.c. " "	10 c.c. " "	" " " 1 to 5 minutes.
4 c.c. " "	10 c.c. " "	" " " immediately.

In highly acid urines the time for disinfection was fractionally longer.

1200 c.c. urine would require	480 c.c. liquid chlorides	for immediate disinfection.
	380 c.c. " "	" " " disinfection in 1 to 5 minutes.
	240 c.c. " "	" " " $\frac{1}{4}$ hour.
	120 c.c. " "	" " " 1

It is generally supposed and has been stated that in highly albuminous urines some disinfectants become less effective, and that in the case of bichloride of mercury the formation of an albuminate of mercury destroys its disinfecting power. Experiments did not bear this out. In a urine containing 0.3 per cent. albumin, disinfection with various substances was just as complete and rapid as in other urines.

$\frac{1}{2}$ c.c. 1-1000 HgCl ₂ in	10 c.c. acid albuminous infected urine	disinfects in 5 to 10 minutes.
4 c.c. 1-20 carbolic in	10 c.c. " " " " " "	" " " in 15 minutes.
2 c.c. 10 per ct. formalin in	10 c.c. acid albuminous infected urine	disinfects in 15 minutes.
$\frac{1}{4}$ c.c. chlorinate lime sol'n in	10 c.c. acid albuminous infected urine	disinfects in 1 minute.
3 c.c. liquid chlorides in	10 c.c. " " " " " "	" " " in 5 minutes.

This short note may help to show the relative values of the various substances employed.

Milk of lime hardly deserves the name of a disinfectant. Carbolic acid is of use only in large amounts and in strong solution if a speedy result is wished. Formalin is hardly serviceable on account of its cost, but is nevertheless an efficient disinfectant. Bichloride of mercury, chlorinated lime and liquid chlorides are of real value, are rapid in their action and are efficient in comparatively dilute solutions.

To summarize briefly the results, one may say that—

I. For disinfection immediately and within 5 minutes,

A volume of infected urine would require	1/2 of its volume of	1-20 carbolic acid solution.
	2/3 " " "	1-40 " " "
	1/5 " " "	1-1000 HgCl ₂ solution.
	3/10 " " "	10 per cent. formalin.
	—1/40 " " "	chlorinated lime solution.
	2/5 " " "	liquid chlorides.

II. For disinfection within 5-15 minutes,

A volume of urine would require	{	2/5 of its volume of 1-20 carbolic acid solution.
		1/2 " " " 1-40 " " "
		1/20 to 1/10 of its volume of 1-1000 HgCl ₂ solution.
		3/5 of its volume of 1 per cent. formalin.
		2/5 " " " 5 " " "
		1/5 " " " 10 " " "
		-1/40 " " " chlorinated lime solution.
		3/10 " " " liquid chlorides.

III. For disinfection within 1/2-1 hour,

A volume of urine would require	{	3/10 to 4/10 its volume of 1-20 carbolic acid solution.
		2/5 " " " 1-40 " " "
		An equal volume " 1-100 " " "
		1/40 its volume " 1-1000 HgCl ₂ " "
		1/20 " " " 1-2000 " " "
		1/10 " " " 10 per cent. formalin.
		3/10 " " " 5 " " "
		1/2 " " " 1 " " "
		1/10 " " " liquid chlorides.

IV. For disinfection within 1-2 hours,

A volume of urine would require	{	2/10 to 3/10 its volume of 1-20 carbolic acid solution.
		2/5 to 3/5 " " " 1-40 " " "
		more than " " " 1-100 " " "
		1/80 to 1/50 " " " 1-1000 HgCl ₂
		-1/10 " " " 10 per cent. formalin.
		-3/10 " " " 5 " " "
		-1/2 " " " 1 " " "
		an equal vol.-1/2 its volume of milk of lime solution.

V. For disinfection within 2-4 hours,

A volume of urine would require	{	1/5 its volume of 1-20 carbolic acid solution.
		2/10 to 3/10 its volume of 1-40 carbolic acid solution.
		an equal volume of 1-40,000 or 50,000 HgCl ₂ "
		" " -1/2 its volume milk of lime solution.

The disinfection of the urine in the bladder and urinary system has been referred to in previous articles, urotropin being the only substance which can claim any direct action when administered by the mouth. As an irrigation, bichloride solutions, 1-100,000 to 50,000 have, in my experience, been very successful, removing the bacilli with much more certainty than any other method.

DISCUSSION.

DR. H. S. ANDERS said that in about 120 cases of typhoid fever that he has treated since he has been in practice he has found that the most anomalous instances have occurred among children. In most of the adults the cases of typhoid fever have run courses more or less typical.

He bore in mind an anomalous case of typhoid fever that is interesting

for two reasons: first, the unusual course of temperature; and second, the unusual association of brachycardia. The patient was a boy, thirteen years of age, who spent the last two weeks of August at the seashore. A week before he came home he said he had been feeling badly. The prodromal symptoms of typhoid fever evidently had been bothering him. Dr. Anders saw him on the 31st of August. His temperature then was 102°. He had a few small spots. His pulse was quite low in proportion to the fever, and ranged between 60 and 70. For eleven days the temperature did not rise above 102°, nor did it reach a minimum point below 99° and a fraction. All this time the pulse-rate did not go above 66, and it was as low as 46, ranging between 46 and 52 for several days. At the end of eleven days the temperature was normal and remained so for five or six days. The pulse-rate remained the same. The temperature rose again and ran the usual course for thirteen days, with then a gradually daily fall. In the second rise of temperature the brachycardia persisted throughout. There were no nervous symptoms. That the second rise of temperature was not a relapse was proven by the fact that the first febrile course was not fully developed. It occurred to Dr. Anders that the peculiarity of temperament in some children may have something to do with the atypical and anomalous course of typhoid fever. The relation of temperament to disease should receive more study.

Referring to Dr. Gwyn's paper, Dr. Anders heartily commended the emphasis placed upon the necessity of disinfection of the urine in typhoid fever. Nurses as well as intelligent members of the family who nurse the patients have neglected very much the disinfection of the urine. In the last few years Dr. Anders, in lecturing to the nurses of the Samaritan and Medico-Chirurgical College Hospitals, has made it his special duty to emphasize the importance of the disinfection of the urine as well as of the feces.

DR. CROZER GRIFFITH said that he did not suppose that Dr. Eshner in his reference to the absence of intestinal lesions meant that he would conclude there were no intestinal lesions from the fact that there were no intestinal symptoms. This would be hardly justifiable, particularly in view of the fact that there have been very few cases collected in which at the autopsy no intestinal lesions were found. If Dr. Griffith remembered rightly, two writers in the *Montreal Medical Journal*, a few years ago, found only nine cases reported in which typhoid fever came to autopsy and exhibited no lesions in the bowel. Another recent article in one of the German papers bears out the paucity of such cases. It is a curious fact, however, that typhoid fever in the fetus presents an exception to this statement. When I had occasion to look up the literature a few years ago, I found but nine or ten undoubted cases of foetal typhoid related in which autopsies and bacteriological examinations confirmed the diagnosis. In not a single one of these were there any intestinal lesions. The germs had entered by some other route than the intestine.

As to the combination of typhoid with other diseases, it certainly may occur with many. There have been numerous cases, for instance, of the

combination of scarlet fever with typhoid. Curiously enough there seem to be few of typhoid fever and measles. Last winter Dr. Griffith saw with Dr. Bennett a case of measles and typhoid fever. He took occasion to look up the literature and found that in twenty-five years of the *Jahrbuch für Kinderheilkunde* there were only two reports of this combination.

Referring to the case of brachycardia mentioned by Dr. Anders, Dr. Griffith said he would not call this symptom an anomalous one. He said that he thought in this disease unquestionably the pulse is slow—slower than it ought to be for the degree of temperature, and this has seemed to him true particularly in childhood. Finally, we must remember that typhoid fever in children, as compared with the disease in adult life, is nearly always somewhat anomalous. It is very prone to run a short course of from fourteen to seventeen days. The attack is oftener more mild than it is in adult life. In fact one often has to be on the alert or one may overlook the disease in children. The temperature in children is also of a different course. One fails rarely to find the up and down temperature characteristic of the latter stages in adults. Symptoms simulating meningitis are particularly common in childhood, and the nervous symptoms are very prone to outweigh the intestinal ones. He had twice seen cases which for several days appeared to be meningitis, and then turned out to be typhoid fever. Intestinal lesions are, as a rule, much less marked in children, and especially in infancy, and the prognosis is decidedly better.

DR. S. S. COHEN said that with reference to the frequent infection of the urine in typhoid fever, and also with reference to anomalous cases of typhoid fever, he would call attention to the fact that in a certain proportion of cases the attack begins with bladder symptoms and may not be recognized as typhoid fever on this account. He recalled the case of a child in which for three or four days he failed to realize the existence of typhoid fever because of such predominance of bladder symptoms—pain and stoppage of urination to a degree indeed suggestive of stone—and the absence of all the usual symptoms of enteric fever except elevation of temperature, this being detected only by repeated careful observations at various periods of the day, taking the temperature in the rectum. The urine was not examined for Eberth bacilli, but the Widal reaction was developed in the blood and the general course left no doubt as to the diagnosis. In a case under his care at the Polyclinic Hospital the patient was admitted with symptoms of cystitis, with pus in the urine as well as typhoid bacilli, and in the course of the case the organisms disappeared from the urine, with cessation of the pain and other bladder symptoms, under the free use of ammonium formaldehyde (urotropin).

DR. DAVID RIESMAN said that Dr. Griffith is certainly right in saying that cases of typhoid fever without intestinal lesions are rare, but they are not so rare as they seemed to be before the discovery of the Widal test. Previous to that time the clinician occasionally made a diagnosis of typhoid fever in cases in which the pathologist afterward was unable to find the char-

acteristic lesions, and the clinician was naturally thought to be wrong. The cloud of having made an error in diagnosis would hang over him unless cultures were made from the spleen. At present whenever the Widal test has given positive results in a case suspected to be one of typhoid fever, and the characteristic lesions are absent at autopsy, it is the pathologist's duty to make a bacteriological study before declaring that the case is not one of typhoid fever. Some time ago Dr. Riesman made an autopsy on a case in which a clinical diagnosis of typhoid fever had been fortified by a positive Widal reaction, but no intestinal lesions were found. The mesenteric glands were slightly enlarged and the spleen considerably so. The typhoid bacillus was obtained in pure culture from the spleen. In some of the anomalous cases of typhoid fever without intestinal lesions the mesenteric glands are much enlarged and the spleen to a less extent; in others, the splenic tumor is the principal macroscopic lesion. In still other cases the morbid lesions are extremely slight and the disease has the character of a septicæmia. Meningeal symptoms are not infrequent in typhoid fever. They may initiate the disease or may occur during its course. They are found in adults as well as in children. Headache is usually the most prominent symptom, and it is of an intense degree. In such cases Dr. Riesman has found leeches to be very efficient in relieving the pain in the head. In closing his remarks he asked whether the presence of bacteria in the urine in typhoid fever has not some prognostic value.

DR. A. E. ROUSSEL said that in reference to that rare condition, the absence of intestinal lesions in typhoid fever, he would state that in the discussion on this subject at the meeting of the American Medical Association which took place at Atlantic City, he had the opportunity of reporting a case which occurred in his wards at the Howard Hospital, where autopsy made by the pathologist, Dr. Williams, failed to reveal any intestinal lesion whatsoever. The case was one of continued fever, the duration at the time of death having been about two weeks. There was enlarged spleen with typical spots, and response to the Widal reaction in at least one instance. Although bacteriological cultures were not made from the bowels, the case may be safely accepted as one of typhoid fever. With Dr. Griffith Dr. Roussel agreed regarding the relative disparity between pulse and temperature in typhoid fever. If there is any one disease which presents that disparity he believes that in the majority of cases—i. e., 60 or 70 per cent. of all—both in children and in adults it must be typhoid fever, particularly in the beginning of the disease when the diagnosis is yet in doubt. For the last ten years he has endeavored to point out to his classes this important fact, and indeed an inspection of the ordinary clinical charts will show this observation to almost invariably hold good. This is of special interest because in one other infectious fever it is said that this same rule holds good—namely, yellow fever. Shortly after the rather explosive symptoms, the initial chill, rise of temperature to 104° or 105°, the pulse does not maintain the proportionate frequency and shortly after falls, while the temperature still remains high. It

is stated by Guitéras that the cause of the immunity of the natives of yellow fever climes is due to the fact that so many of the children have probably passed through this disease without it being recognized on account of the mildness of the symptoms. That is an important point showing similarity between this and typhoid fever. It may be fair to state that most cases of typhoid fever in children are expected to recover. All of the so-called atypical cases do not occur in childhood. Dr. Roussel has under his present care a nurse, in the Howard Hospital, who some four weeks ago went to bed with a continued febrile temperature lasting exactly eleven days. There was a little enlargement of the spleen and the spots were doubtful. The Widal test was positive in half a dozen instances. There was no history of any previous continued illness. At no time did the temperature ever exceed 102° , and at all times the patient was desirous of reading, doing fancy work, etc., so little did she feel ill. During the past two weeks the temperature has remained normal. There has been no relapse and apparently one can accept this case as being over. Previous to the use of the Widal test he would have been much inclined not to call the case one of typhoid fever, but simply one of protracted simple continued fever. He considers Dr. Gwyn's paper of importance, and it should emphasize the necessity for thorough disinfection of the urine.

DR. J. F. SCHAMBERG said that in reference to the co-existence of two infectious diseases he recalled a case in which typhoid fever and leprosy were seen in the same patient. The onset of the typhoid was not deceiving: the man had received a series of hypodermic injections of antivenomous serum (antivenene) After each injection there was febrile reaction, and after the ninth injection the temperature rose and remained high. Typhoid fever was not suspected until the continued temperature had existed for some days. The Widal test was made, the blood reacting positively. All of the characteristic symptoms of enteric fever were present. The course of the disease was in no way influenced by the leprosy, nor was the leprosy modified by the typhoid fever.

DR. M. H. BOCHROCH said that in reference to anomalous cases of typhoid fever, he was much interested in one such case, as he himself was the patient. From the 4th of July, 1897, when he was taken ill, until the 27th of August, there was not a day during which his temperature fell below 100° . It was frequently as high as 105° , one day 106° , the morning temperature often being higher than that of the evening. On three mornings he had a typical chill, and on three he had hemorrhages. The pulse was never above 100. On the 27th of August his temperature was 100 and on the 4th of September he was out of bed. Two weeks later he developed a swelling of the left tibia, which later decreased, but has not yet quite disappeared. His fever was accompanied by delirium and delusions.

DR. WILLIAM S. FORBES said that in relation to the application of bichloride of mercury in the bladder he was in the habit of using this remedy in surgical diseases of the bladder and especially in the treatment of vesical

calculi, and he found from a large experience, that the bladder would never tolerate bichloride of mercury in a solution of 1 : 6000. He has used solutions of 1 : 10,000 and 1 : 20,000 with the happiest effect, but then there are some bladders that will not tolerate bichloride of mercury even in 1 : 100,000. He believed that there may be periods in cases of typhoid fever when in very weak solutions it would be very applicable, especially in the early stages. He has found that by first washing the bladder out several times with a borated solution, it will then better tolerate a weak solution of bichloride.

DR. JUDSON DALAND said that having had several opportunities of seeing the patient, referred to by Dr. Eshner as an example of typhoid fever in which constitutional symptoms were absent, he desired to corroborate all that had been said. He saw this patient upon several occasions and all through the attack the man invariably stated that he was feeling perfectly well. The occurrence of typhoid fever with the almost complete absence of subjective symptoms is rather unusual and it was well that this case has been placed on record.

Reference was made to a patient suffering from typhoid fever with petechial eruptions replacing the ordinary rose-colored spots. Dr. Daland remembered studying such a case in the general hospital in Vienna, where each spot, as it appeared, was clearly shown to be an extravasation of blood. The patient died in three days. A careful study of the literature would probably demonstrate that petechial eruptions in typhoid fever rapidly terminate fatally.

Referring to double infection in typhoid fever Dr. Daland said so many cases of this combination have been reported during the past five years that it is scarcely worth while to refer to others. Yet he recurred to one case previously reported, one in which the paroxysms were present typically before the symptoms of typhoid fever showed themselves markedly, and while these were present the malarial phenomena disappeared and at the close of the typhoid fever they reappeared. This peculiarity in regard to this one case of typhoid fever which had malarial paroxysms at the beginning and at the close was rather interesting.

The paper of Dr. Gwyn is peculiarly valuable in showing the absolute necessity for the most careful consideration of the possibility of the frequent transmission of typhoid fever by means of the urine.

DR. A. A. ESHNER referred to observations made with reference to the permeability of the intestinal tract to bacteria, said it may be assumed that both the skin and the mucous surfaces are not permeable to bacteria under conditions of perfect integrity. Slight lesions may occur in either of these structures and a portal of infection be thus opened. In this way can be explained the presence of the bacterium coli commune in the peritoneal cavity not necessarily as a post-mortem invasion. Some observations have been made in this connection in which after artificial obstruction of the bowel in lower animals the bacterium coli commune could be found in the peritoneal cavity, sometimes in the bladder, and sometimes in remote organs. It is a question whether the transmission of the bacteria takes place by contiguity or continuity of

structure or by metastasis, but it seems not impossible that all of these means of transmission may be availed of.

DR. N. B. GWYN replying to Dr. Riesman said that he would not regard the presence of bacteria in the urine of prognostic value. In Richardson's series of cases but very few terminated fatally. Among Dr. Gwyn's there were only three, and two of these were moribund when seen. He has had other cases in which bacteria were present in the blood, and of ten such but three terminated fatally. Some of these were probably the lightest cases of typhoid fever that one might see. More extensive work has been done by Kuhnaw and he finds as have others that, in 20 to 30 per cent. of all cases, bacteria are present in the blood as well. Most likely the 20 to 30 per cent. of cases in which the bacteria are found in the urine corresponds closely to the percentage in which the bacteria are found in the blood.

In reply to Dr. Forbes, he said he never used bichloride of mercury irrigation save in convalescence, and then in amount of 1:50,000, or more often 1:100,000, and has never found unfavorable results.

Only rarely do the bacteria in the urine set up cystitis. There are only two definite cases of chronic cystitis on record, one in which cystitis persisted for two years and Cushing's case lasting five years. Cases of slight cystitis are frequent.

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The Registration of Tuberculosis.

BY HERMANN M. BIGGS, M.D.

[Read, by invitation, November 14, 1900.]

I desire to express my sincere appreciation of the honor conferred by the invitation tendered by the Directors of the Philadelphia County Medical Society to address the Society on "The Registration of Tuberculosis," and for this I wish to render my grateful acknowledgment. I have accepted the invitation more readily because for many years I have been greatly interested in the sanitary surveillance of tuberculosis, and it has been my great privilege to assist somewhat in advancing the measure adopted by the Department of Health of New York City in dealing with this disease.

There is no problem which confronts the sanitary authorities of the large municipalities at the present time exceeding in its importance and magnitude that presented by the tuberculous diseases, nor is there any other sanitary proposal which offers promise of such large returns in a diminishing morbidity and mortality-rate as one which provides successful measures for the prevention of tuberculosis.

This is not a new problem. The tuberculous diseases are not more prevalent than formerly; on the contrary, there has been a steady and very material decline in the death-rate caused by them; but only in recent years have the sanitary authorities and the medical profession begun to have some realization of the great possibilities in the way of the restriction of this disease. A comprehension of the full meaning of the discovery of Koch on the prevention of tuberculosis has very slowly found its way into the minds of the medical profession, and even now after eighteen years a large proportion of the profession have

not grasped its vast significance on the future happiness and prosperity of the human race. Statistics showing the great prevalence of this disease have been quoted frequently enough to have almost lost their meaning, and the people, the legislators, the sanitary authorities, and even the medical profession have become indifferent to the vast expenditure in suffering and death unnecessarily paid by the human race to this evil. Only limited and ineffectual efforts are being made in its suppression. We still view with comparative indifference the ravages of a disease which causes from one-quarter to one-third of the suffering and death at the best period of life—fifteen to sixty-five—and this, too, when the evidence at command should be, it seems to me, conclusive to every reasonable mind, that it can be largely prevented at a comparatively small cost in sacrifice, labor and money. I make this statement with a full realization of its meaning, and after a familiarity with the sanitary problems involved, gained by an active participation in their study in a great city for a period of more than twelve years.

In 1888, through my intercession, the Board of Health of New York City passed a resolution asking for a report from the consulting pathologist on the causation and prevention of tuberculosis. I would add to-day but one measure to those advocated at that time, namely, the compulsory notification of this disease. But unfortunately the position recommended then was not reached by sanitary achievement until ten years later.

The practical difficulties in the way of the notification of tuberculosis are undoubtedly considerable, and sanitary authorities generally in Europe with characteristic conservatism have pronounced against it. Sir Richard Thorne, medical officer to the local Government Board of Great Britain, in the Harben lectures, 1898, on "The Administrative Control of Tuberculosis," after a careful consideration of the various problems presented under the English law relating to infectious diseases, pronounces definitely against it, on the ground that the hardships to the individual which would follow notification and the enforcement of proper regulations would be so great as to render this measure unjustifiable.

He says: "The justification for the demand that phthisis shall be compulsorily notified lies in the fact that the person in question is suffering from a dangerous infectious disease, communicable from person to person; hence the question is already arising, whether it is right to allow such a person to be in constant association with hitherto healthy people by day, and still more so by night. It is quite certain that the need for adopting special precautions as to the sputa, etc., would lead

to a large number of such persons being quietly dismissed from their posts. If such persons need fresh employment they will certainly take care to avoid directing attention to their malady by the adoption of the precautions urged on them by the interests of the public, and it is equally certain that they would to the utmost avoid consulting another medical practitioner, because their disease would again be known, and the same consequences that followed the first notification might again be brought about. Without following out such cases as these for several years and to the bitter end, it will suffice for me to say (adds Thorne) that in my opinion a large amount of harm would result if phthisis were included in the list of notifiable diseases under the English act. The certain knowledge that notification and the intervention of public officers would ensue would prevent resort to medical advice in the early stages of the disease when its progress can best be arrested."

He says: "I believe that the attempt on the part of the phthisical persons to avoid notification would in itself do a great amount of harm, not only to the individuals already suffering, but to the healthy with whom they are in daily association. The English law as to the compulsory notification of contagious diseases was never intended to bring under a system of public supervision even a single individual who during a long series of years would have to follow his or her usual vocation. This supervision might in a majority of cases be carried out with every discretion and every effort to avoid publicity, but if it were carried out under the present system of sanitary organization or under the present law it could not but run the risk of leading to hardship beyond that which the public has a right to expect others to suffer on their behalf, and indirectly this would, in the end, defeat the primary object held in view."

It may be said in reply to this, that there are several implied assumptions which do not appear to be justified by the facts. In the first place, it is assumed that notification will give a publicity which did not previously exist. This assumption is certainly untrue, under the regulations adopted by the Department of Health of New York. There is no reason why notification, followed by suitable instructions to the patients, should involve such publicity. In the second place, with the increasing knowledge of the nature of tuberculosis among the laity, it is unreasonable to believe that a person suffering with cough and expectoration and showing the ordinary signs of advancing tuberculous disease would not be recognized by his associates as a consumptive, and he might, therefore, under any conditions be subjected to the same hardships which Thorne feels must necessarily follow notification. On

the other hand, as the knowledge of the exact nature of tuberculosis becomes thoroughly disseminated among the people, they would soon understand that a consumptive who habitually disposes of his sputum with care is not a source of danger. The contention of Thorne, that these patients would recognize early the nature of their disease and avoid medical advice is unreasonable, because the experience of every practitioner is that the tendency of consumptives is always to regard the cough and symptoms as of no consequence and to postpone from week to week and month to month consulting a medical adviser, because they believe the disease is of little importance. It is incomprehensible to me how a sanitary officer can assume the position that a tuberculous patient should be left in a general workroom carelessly disposing of his expectoration and thus exposing large numbers of others to possible infection, because it is believed that the observance of proper sanitary precautions in regard to the expectoration will be followed by a recognition on the part of his fellow workmen and his employer of the tuberculous nature of his affection, and this may result in his dismissal. This is in substance an encouragement to consumptives to neglect the required sanitary precautions, in order that no suspicion may arise as to the nature of their disease; and it involves the exposure of considerable numbers of persons, for several years perhaps, to tuberculous infection, in order that the dreaded day may be somewhat postponed for the individual. This attitude on the part of the consumptive, and the participation in it on the part of the medical adviser, to say nothing of the sanitary authorities, seems to me most reprehensible.

I believe that measures differing essentially in their nature from those which are observed in the contagious diseases should be observed in relation to tuberculosis. The facts do not warrant our classing tuberculosis with smallpox, measles, diphtheria, and scarlet fever. It is a dangerous, infectious, communicable disease, but differs in many important particulars from these highly contagious affections. But the fact that the disease requires different treatment from the contagious affections does not justify us in neglecting those things which are obviously necessary for the protection of the public health. If the sanitary authorities in England or elsewhere have not the power under the present statutes to place tuberculosis in a separate class, as Thorne seems to intimate, and to deal with it in a different and proper way, then certainly some attempt should be made to obtain such power through legislation. In New York State no such additional power is required, and I doubt whether it is in any one of the United States.

It should be said, however, that some of the municipal sanitary authorities of Great Britain have asked for power from the local government board to institute special measures in relation to tuberculosis, and in several cities, as Manchester and Brighton, a system of voluntary notification, with measures for inspection, disinfection, etc., have been adopted; and many of the municipal sanitary authorities of Great Britain have urgently besought the local government board to place tuberculosis in the class of notifiable diseases.

It should be said that in France also the attitude of the medical profession toward tuberculosis is much the same as that in Great Britain. A special commission of the Academy of Medicine in Paris in May, 1898, reported against such a procedure. Two principal reasons were advanced against the proposition; the first points out that notification involves the divulging of a medical secret which would be harmful to the patient (this also equally applies to the contagious diseases), and insists that as the public does not regard tuberculosis as in the class with diphtheria or smallpox, and as it is considered by them as hereditary, the public would not accept such a legal enactment without protest and resistance. The second is regarded as more important, and is that in a family unwilling to follow instructions, restrictions would be impossible, as they would necessitate an almost continuous intervention on the part of the sanitary officers for months and years. The only efficient alternative in such cases, it is pointed out, would be the consignment of the consumptive to a hospital—a practice followed in Norway. This, it seems to me, is the proper course. The commission concludes that compulsory notification must not be dreamt of—at least immediately.

In considering the advisability or the sanitary necessity for the compulsory notification of tuberculosis, certain facts in relation to the disease, perfectly well known and much insisted on in all recent writings on this subject, must be repeated. These may be placed seriatim as follows:

1. Tuberculosis is an infectious and communicable disease produced by the tubercle bacillus.
2. There is no satisfactory proof that the tubercle bacillus multiplies outside of the living body under natural conditions; it follows as a necessary sequence that every case of tuberculosis is produced by the reception of the same *identical tubercle bacilli* which have been thrown off by some other human being or by some animal suffering with tuberculosis.
3. The tubercle bacilli producing an infection are generally obtained from dust contained in the air breathed, or in the drink or food taken.

4. The tubercle bacilli thrown off by a person or animal suffering from the disease are contained solely in the discharges from the tuberculous tissues, and it should be possible to absolutely control their dissemination.

5. It follows, therefore, that tuberculosis is preventable, and (in the early stages) clinical experience shows that it is curable.

6. It is by far the most fatal disease with which we have to deal, and from both an economic and sanitary stand-point is of vastly greater importance than any other infectious disease, both because of the number of deaths it causes, and the suffering it produces. Its importance is further enhanced because it occurs to the greatest extent in the working period of life, and its victims are cut off at the time of their greatest usefulness.

7. Its prevention requires the exercise of enlightened cleanliness on the part of its victims, which presupposes education, suitable hospital accommodations for the care of advanced cases among the poor, and the efficient disinfection of dwellings.

These ends can no more be attained in tuberculosis without registration than they can be in the contagious diseases.

It seems to me that compulsory notification is a necessary preliminary to other measures and that little further advance can be made without it, or at most the advance must be exceedingly slow.

I believe that the arguments which have been urged against compulsory notification are usually based on improper or erroneous conceptions are not valid objections to the adoption of this measure.

It has been urged against it:

1. That the disease is not highly contagious, as are those diseases in which notification is required; that it is not of limited duration, and that long and constant exposure is required to produce infection. It may be said in reply, simply, that the evidence is conclusive, that tuberculosis is produced by the tubercle bacillus and that every case is the result of infection by the same tubercle bacilli, which have been thrown off by some other being suffering from tuberculosis. I cannot see that any other answer is required, for it matters not how indirect the infection is, or how difficult it may be to trace it, or how slow and insidious may be its development, or how prolonged the exposure required, the one fact remains that tuberculosis is the result of such infection, and if the arguments quoted have any effect it is to emphasize the importance of the adoption of proper sanitary measures, including registration, because the disease on account of these peculiarities is far more easily prevented than the purely contagious affections.

2. It has been urged that tuberculosis is so widely distributed—"so ubiquitous"—that any attempt at its prevention by the means advocated should not be considered. This argument again is one of the strongest reasons which could be urged for action. The proposition that any attempt to cope with this question should be abandoned because the problem is so large is certainly not worthy of consideration. It surely cannot be seriously urged that we shall give up active preventive measures because an immediate completely successful result cannot be obtained. No one will maintain that a thousand sources of infection will not produce more cases than five hundred; no one will insist that sanitary precautions are useless and are to be abandoned because they are not absolutely reliable, and because they are simply means by which we diminish to a greater or less degree the chances; all sanitary measures are subject to limitations in greater or less degree; and so in tuberculosis, while no one would assume that in a single month or in a single year all of the thousands and tens of thousands of sources of infection in a great city can be removed, yet if one-quarter or one-third can be eradicated there will be a proportionate gain, which will be increased each succeeding year. To individualize still more, it is certain that if an advanced case of pulmonary tuberculosis is taken away from his family in a tenement house, or is taught to carefully destroy his sputum, the chances of the infection of members of the family or of the inmates of the house will be diminished, and with each source of infection thus removed a definite gain will surely follow.

3. It has been strongly urged that in many instances it is undesirable that the patient should know that he is the subject of tuberculosis, and that this knowledge will affect his well-being.

This view, although earnestly held by many physicians, I believe is usually erroneous. In a considerable experience in dealing with consumptives during the last fifteen years, I have become convinced that by far the best course to pursue in most cases when an individual is found to be suffering from tuberculosis is to frankly inform him of the fact. The information may be a shock and a source of mental suffering and anxiety, but the ultimate effect will, I believe, be in the patient's interest, for the patient will then observe the precautions which are required for his own recovery and for the prevention of infection in others and reinfection in himself. He will further consent to the adoption of such radical changes in his life and work, if these be possible, as are necessary for increasing his chances of recovery. I believe that the actual knowledge of the condition existing is less harmful than

the apprehension and dread which these patients often have before they possess the knowledge. How frequently have I heard patients complain most bitterly of their physicians for not having informed them of the nature of their disease. In any event it certainly will not be maintained that to save the individual some suffering, it is justifiable that all who come in contact with him for months or for a period of years should be exposed to the danger of infection. It surely will not be maintained that the possibility of bringing suffering, disease and death to many others, to say nothing of the danger of self-reinfection, is a lesser evil than the possibility of causing some temporary suffering to the individual. Further than this, if the disease is in a curable stage this knowledge increases the chances of recovery (if it is in an incurable stage, then at most it renders a few months of the individual's life a little less happy than they might otherwise have been). One of the fixed principles in the organization of society is that, if necessary, the welfare of the individual must be sacrificed to the welfare of the community.

4. It is urged that if it becomes known that an individual has tuberculosis, he will become socially ostracized. In reply it may be said that this statement is greatly exaggerated. Already, with the increase in popular knowledge in regard to the nature of tuberculosis, the unreasoning dread of the disease which existed at first is disappearing and is being replaced by a more intelligent conception of its nature and the means for its prevention. It cannot be too strongly insisted that, with the observation of proper precautions a tuberculous patient may be absolutely free of danger to his intimate associates. When the knowledge of this fact has become firmly fixed in the minds of the community a great advance will have been made.

5. It is urged that the disease is of long duration; that the individual may be able to carry on his usual vocation for a long period of time, and that the knowledge that he has tuberculosis may result in his being deprived of employment, or may render it impossible for him to find a suitable home.

In reply to this it may be said that too much importance is given to these latter statements: first, because notification to the sanitary authorities does not involve notification to the community at large; second, because in most occupations if the individual observes proper precautions he does not become a source of danger.

Even if all were true which is urged, certainly these considerations would not justify the continuous exposure to infection of large numbers of persons, with the moral certainty that some would contract the

disease, in order that one individual might be able to pursue for a few months or a year or two longer his usual occupation.

6. It is urged that the medical profession and the community are not yet ready to accept such advanced measures, and that it is useless to attempt to enforce such measures without their support.

In reply to this, it may be said that experience has shown that the people as a whole and even most consumptives will and do support this measure, and that the fact of notification in itself is in the first instance of great educational value. In no way can we impress so strongly on both the profession and the people the communicability of this disease. No reasonable sanitary officer would expect to put into force regulations requiring the notification of tuberculosis, with the same conditions and in the same way, that a similar one in regard to smallpox would be enforced. The process of the enforcement of such a law must be developmental, and it must be distinctly understood and strongly and constantly emphasized, that tuberculosis is a different kind of disease from smallpox or scarlet fever or any of the other highly contagious affections. It should be placed in a different class, and I strongly deprecate the practice of calling it contagious. In New York City the amendment to the Sanitary Code requiring notification declares tuberculosis to be a communicable disease (not a contagious one), and it is stated explicitly in the circulars of information, that it differs in many and important essentials from those diseases commonly known as contagious. The notification must be within one week of the time that the patient comes under observation. In adopting the system of notification, it was first applied by a resolution of the board solely to public institutions, hospitals, dispensaries, etc., those dealing chiefly with the tenement-house population. After this resolution had been in force for nearly three years it was replaced by an ordinance, and its scope extended to include also cases occurring in private practice.

The ordinance adopted in New York City in 1897 reads as follows:

“Resolved, That pulmonary tuberculosis is hereby declared to be an infectious and communicable disease, dangerous to the public health. It shall be the duty of every physician in this city to report to the Sanitary Bureau in writing the name, age, sex, occupation, and address of every person having such disease who has been attended by or who has come under the observation of such physician for the first time, within one week of such time. It shall also be the duty of the commissioners or managers, or the principal, superintendent, or physician of each and every public or private institution or dispensary in this city to report to the Sanitary Bureau in writing, or to cause such report to be made by some proper and competent person, the name,

age, sex, occupation, and last address of every person afflicted with this disease, who is in their care or who has come under their observation, within one week of such time. It shall be the duty of every person sick with this disease, and of every person in attendance upon anyone sick with this disease, and of the authorities of public and private institutions or dispensaries to observe and enforce all the sanitary rules and regulations of the Board of Health for preventing the spread of pulmonary tuberculosis."

I may say that when this ordinance was adopted every important medical society in New York City protested against the action of the Department of Health, but these protests showed by their wording and the remarks which accompanied them, that the protestants did not understand the scope of the action of the Department of Health, and that they had arisen in protest against an imaginary evil. They protested against tuberculosis being called a contagious disease, but the Department of Health never called tuberculosis a contagious disease, and expressly stated that it was communicable and infectious, but not contagious. A determined but unsuccessful effort was made by the New York County Medical Society to obtain legislation which would deprive the Department of Health of the power to deal with tuberculosis.

There have been few protests, however, during the last two years against the action or attitude of the Department; there has been acquiescence, and apparently approval, and it is certainly true that the action of the Department has been followed by greatly increased interest and knowledge regarding tuberculosis, and by the institution of active measures in the State and in the city looking toward its care and its prevention.

It is true that the Department of Health has not endeavored to enforce strictly the regulations. It was not the intention to do so when they were enacted. It has not prosecuted physicians who have failed to report cases; the Board is well aware of the fact that large numbers of cases are not reported; but still a constant advance in the right direction is being made. The attention of physicians who report deaths due to tuberculosis in cases which have not been previously notified is now called by special letter to the provisions of the sanitary code requiring the reporting of such cases, and they are asked for an explanation for the failure to report the case. The superintendents of public institutions are constantly reminded of their obligations in this matter, and usually twice a year a census is made of all the cases under care in all the public institutions in the city. About 9000 new cases (duplicates excluded) are reported annually, and these as well as the premises

where 9000 deaths occur are inspected. It is the purpose of the Board of Health to ask for a special additional appropriation for the coming year to extend and perfect the work now being done.

No method can be devised, so far as I can see, which will give the required information to the sanitary authorities regarding the cases of tuberculosis in tenement houses, lodging houses, hotels, boarding houses, etc., excepting a system of compulsory notification. It would be undemocratic, and probably illegal, to require the reporting of cases living under certain conditions, as in tenements, and to exclude those living under other conditions, as in private houses, but the sanitary authorities may use their discretion in regard to the measures which shall be adopted under varying conditions, depending upon the danger which they conceive exists as far as the public is concerned. As a matter of fact, in private houses, and in cases reported by private physicians, no action is taken, excepting as to registration; this position is assumed and conditioned upon the medical attendant giving such information as is necessary to the patient in regard to the means for the prevention of the disease. The fact that the physician reports the case is regarded as constituting proof of his realization of the communicability.

A large number of cases are reported through the examinations of sputum; and a curious feature presented in this is that physicians, who strongly object to reporting cases of tuberculosis, will send specimens of sputum for examination, with the data which constitute a report. About 2500 cases from private practice will be reported the present year through the sputum examinations.

It does not seem to me that there has been one single valid objection advanced to a rational system of notification of tuberculosis. There is no reason why every disease in which notification is required should be placed in the same class. Tuberculosis should be declared to be an infectious and communicable disease and treated alone, or in a class including typhoid fever, and perhaps some other diseases.

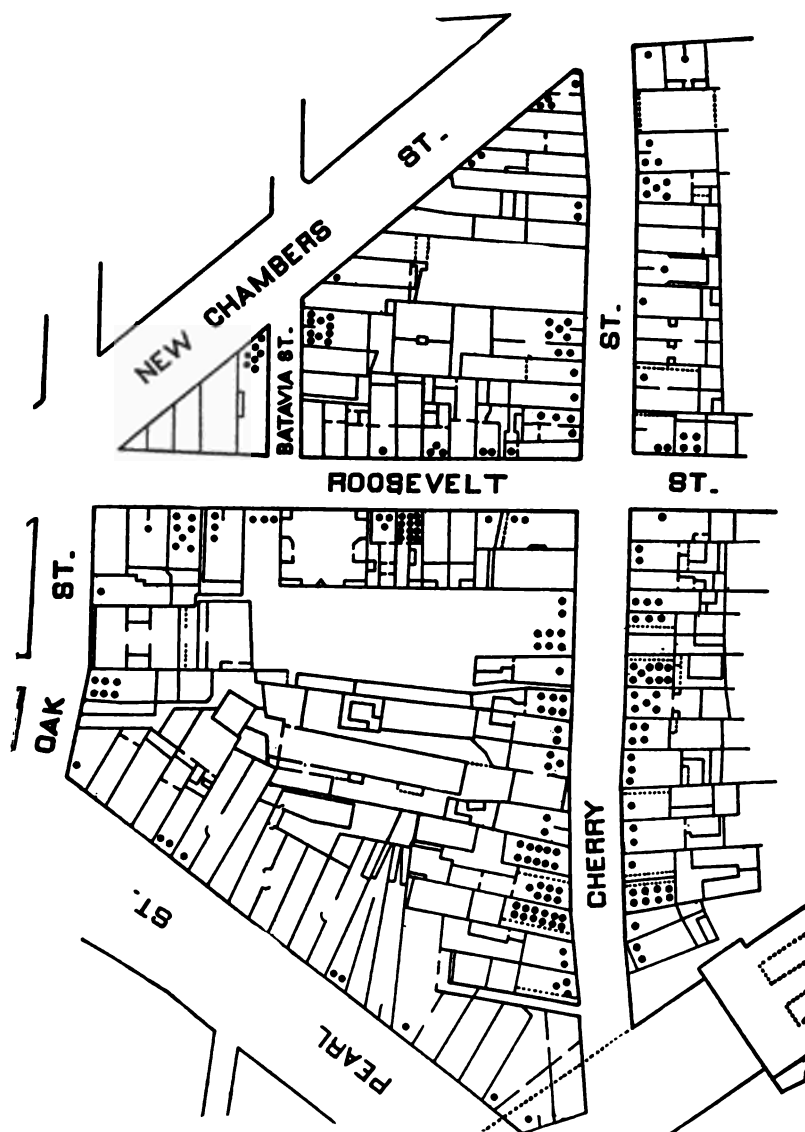
In order that cases of tuberculosis shall be properly dealt with it is necessary that the sanitary supervision in every municipality shall comprise: 1. Compulsory notification. 2. Suitable plans for the education of the people, including the visiting and instruction of cases, especially those residing in tenement houses, lodging houses, boarding houses and hotels (I would not include in this measure persons living in their own houses). 3. A complete and efficient scheme for the disinfection or renovation of premises vacated by death or removal. 4. A hospital equipment, consisting of a reception pavilion for tuberculous patients, a suitable institution within or near the municipal limits, for the care

of advanced cases, and a country sanatorium in a well-situated locality for the care of incipient cases. 5. The power of compulsory removal and retention of patients in a hospital when necessary, in the same manner as is practised in the contagious diseases. In only rare instances would the exercise of this power be required, but occasions sometimes present themselves in which such action is necessary. The following is one of a number of instances which have come under my observation :

The owner of a sweat-shop in a tenement-house district was found to be suffering from advanced pulmonary tuberculosis. He employed in his workrooms, which were close and badly ventilated, a considerable number of young women. He was excessively filthy in his habits, and refused to follow directions given in regard to the care of his expectoration, and he persisted in spitting on the floor, wall, or anywhere that was convenient. I should unhesitatingly favor the forcible removal of such a patient by the sanitary authorities. It may be said, however, that if the power for forcible removal was possessed by the authorities it would rarely be necessary to exercise it.

Let us consider for a moment, what registration has already shown in New York as to the nature and the extent of the problem with which we have to deal. At the beginning of this work in New York City in 1894, I had prepared sectional maps of the city, showing every house-lot in the boroughs of Manhattan and the Bronx, on a scale large enough so that reported cases and deaths could be plotted in each house-lot by conventional signs, which indicate the month and the year of the report. From these maps I have selected a few blocks in which the largest number of cases have occurred, and had them reproduced. On these maps each case reported is indicated by a dot. These show that on a single street-block as many as 102 cases have been reported within a period of four and three-quarter years, and as many as 24 cases in a single house. For example, on the block on Cherry Street between Pearl and Roosevelt, 102 cases have come to the notice of the department from April, 1894, when this work was begun, to January 1, 1899. The population of this block in January, 1900, as enumerated by the sanitary police of the Department of Health, was 1165. On another block bounded by Cherry, Market, Catherine and Monroe Streets, there were 241 cases of tuberculosis, with a population of 3688. In a third one, which includes particularly the Chinese quarter, bounded by Chatham, Mott, Bayard Streets and the Bowery, there were 206 cases, with a population of 2102. These districts represent perhaps the worst conditions existing in the city, but the number of cases in many

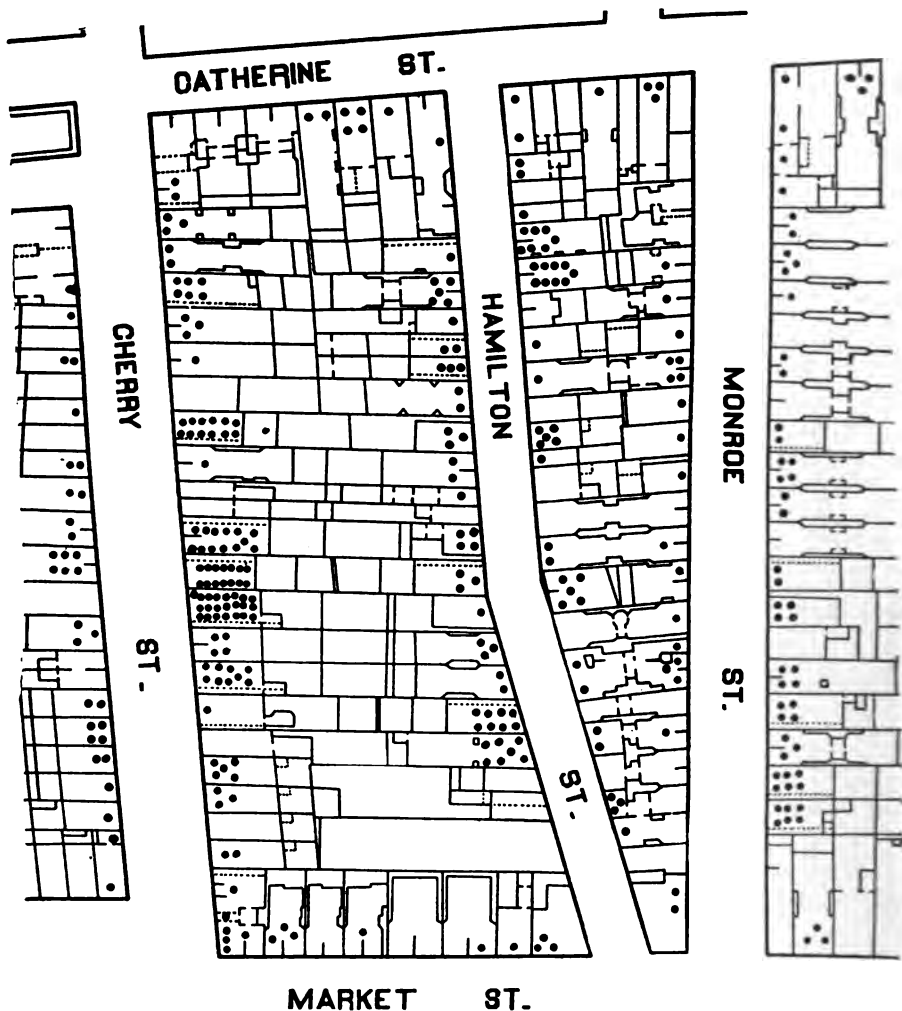
FIG. 1.



Reproduced from the sectional maps of New York City on which are plotted the reported cases and deaths from pulmonary tuberculosis from the beginning of the work in 1894 to January 1, 1899. Each case reported and each death is indicated by a dot (duplicates excluded). The lots on which no dots are seen are chiefly warehouses, and are not occupied at all as dwellings.

others nearly approximates the number found in these. And throughout the tenement-house districts everywhere large numbers of cases have been reported. I presume we must add to these numbers at least

FIG. 2.



Reproduced from the sectional maps of New York City on which are plotted the reported cases and deaths from pulmonary tuberculosis from the beginning of the work in 1894 to January 1, 1899. Each case reported and each death is indicated by a dot (duplicates excluded). The lots on which no dots are seen are chiefly warehouses, and are not occupied at all as dwellings.

FIG. 3.



Reproduced from the sectional maps of New York City on which are plotted the reported cases and deaths from pulmonary tuberculosis from the beginning of the work in 1894 to January 1, 1899. Each case reported and each death is indicated by a dot (duplicates excluded). The lots on which no dots are seen are chiefly warehouses, and are not occupied at all as dwellings.

one-half more and perhaps nearly two-thirds as many more to cover the unreported cases, for I do not believe more than two-thirds of the cases in Manhattan and the Bronx are now reported.

With a problem of such magnitude as is here presented, how are the authorities to obtain information in regard to the cases without compulsory notification? and without knowledge, how can they hope to deal with any measure of success with the existing conditions? I have never heard those who object to registration suggest any practical alternative, and I believe there is none to be found. It may be said that such conditions as have been described do not exist in this country outside of New York City. Perhaps this is in a measure true; but no one can foresee what will be found in any city until the cases are registered, and I have no doubt that conditions approximating those present in New York City would be found in every large city.

It may be asked, When cases are registered, what sanitary measures should be proposed for the prevention of the disease? In reply I would say:

1. The inspection of the premises in tenement houses, lodging houses, hotels, boarding houses, etc., and the personal instruction of the consumptives by medical inspectors as to the necessary precautions, and the furnishing of proper circulars of information in regard to the disease and the method of its extension.

2. The disinfection or renovation of all premises vacated by the death or removal of consumptives, and, when required and practicable, the employment of the same measures during life.

3. The removal (so far as it is possible, to provide hospital accommodations) of all advanced cases who are unable to work and who will consent to enter a hospital.

4. The provision of accommodations in country sanatoriums for incipient cases.

5. The supervision of shops, occupations, and conditions, where consumptives are employed.

6. The forcible removal, in those rare instances, in which consumptives are unwilling or unable because of weakness, to observe required precautions, and where such removal is deemed necessary, because of the unusual exposure to which others are subjected.

Shall we allow tradition, prejudice and sentiment to longer delay the solution of this the most important, as judged from every stand-point, of all the sanitary problems of the time? If opposition there be, it is largely in the medical profession, for our experience in New York has shown that the people in general and the lay press will warmly support

all measures designed for the prevention of this disease. As to the final adoption of compulsory notification, I think there can be no question. It only remains to be decided whether the eighteen years which have elapsed since Koch's discovery have sufficed to educate and convince the profession, for it is from them that the initiative must come.

There has been a reduction in the mortality from the tuberculous diseases in New York City since 1886 of more than 35 per cent., and I have no hesitation in saying in conclusion that I believe, with a complete and efficient scheme for dealing with pulmonary tuberculosis, including suitable hospital accommodations and the proper enforcement of precautionary measures, the death-rate from the tuberculous diseases in New York City may be further reduced one-third within a period of five years. This would mean the saving of 3000 lives annually. Notification seems to me a logical necessity and a necessary preliminary to the adoption of other sanitary means for the prevention of this disease.

DISCUSSION.

DR. A. C. ABBOTT said he believed that if the working of this system of registration and the object aimed at were definitely understood there would be no necessity for discussion. He thinks the opposition to registration in connection with tuberculosis is due largely, as Dr. Biggs has said, to a misunderstanding of the subject. There is no intention on the part of the authorities to place upon tuberculosis any such restrictions as there are upon the acute transmissible diseases. The main object of registration is to obtain precise data as to where cases of tuberculosis are located in order that conspicuous foci of infection may be brought under the control of the proper authorities. There are many individuals in every community who require no supervision by the health authorities, but there are also many more, particularly among the ignorant and destitute, who either cannot or will not take proper precautions to prevent the spread of the disease. These latter are a menace to the public health and should be under sanitary control.

About five years ago a resolution was passed by the College of Physicians in which the opinion was expressed that registration of tuberculous subjects would stamp them "as the outcasts of society." This has always seemed to the speaker as an extravagant view of the matter. He believes it quite possible for these patients to be registered without either they or their friends being aware of it. A large proportion of all tuberculous subjects in every community are people who cannot or will not, or perhaps both, follow the directions of their physician. In these cases the board of health should be authorized to look after them and to disinfect premises. This cannot be done without the knowledge of their location. Moreover, how is the board

of health to know the value of any steps it may take without the necessary statistical data?

With the understanding that intelligent discrimination is to be exercised; that the measures employed are adapted to the requirements of the case; and that official control is to be directed to only those cases and localities that are manifestly a menace to the public health, Dr. Abbott said he failed to appreciate any argument against the registration of tuberculosis. He was particularly of the opinion that the poor and destitute should be regarded as wards of the State, and that properly equipped sanatoria should be provided in which these persons may receive the necessary care. He fully endorsed the paper of Dr. Biggs.

DR. JAMES C. WILSON said that it is a sign of the times that the Philadelphia County Medical Society should have presented to it a paper so calm, so dispassionate, so judicious as the one read by Dr. Biggs. The agitations of this matter that have from time to time occurred, found Dr. Wilson in a state of indecision as to his position; nor, until a very few minutes prior to speaking had he been able to clearly see which side he should select. He had been deterred from coming to positive conclusions not so much by the spectres evoked to frighten those who advocate the system of registration of pulmonary consumption, as by doubts as to the practicability of the matter, which has been fully realized by those most interested in the subject. He always held that in instituting a radical public measure those who seek to establish it should ask themselves definitely the question, what good is to be obtained by the measure? In this connection there are, aside from collateral advantages, two important objects, the first of which relates to vital statistics, the determination of the individuals of any community who are infected, the age at which infection takes place, the progress, the isolation of cases, mortality, and matters of that kind. The second relates to preventive medicine, and the two objects are interdependent. He has felt satisfied that in the discussions to which he alluded that, in the state of mind then existing, the first of these purposes would entirely fail of accomplishment by any such regulation; that the attitude of the medical profession was so widely hostile to any such measure, that it could scarcely be enforced, except to a limited extent, and limited enforcement without the co-operation of the whole profession would render statistics thus acquired wholly worthless. In the discussion bearing upon the placarding of houses in acute infectious and readily transmissible diseases, held in the same hall a few months ago, it was openly stated by more than one gentleman that it was his habit to evade the law; so that, it seems, that if nothing else could be accomplished, the measure would be of much value in the education of the profession. The education of the physician would also mean the education of the people. The great spectre in one's mind of the social outcast, and of the lazar-house to which those who are near and dear would be relegated, if it were known that they show the physical signs, or have the bacteriological manifestations of pulmonary tuberculosis, has driven into a panic many members of the profession who, were the matter presented to them in the

careful, deliberate manner of the evening's paper, would doubtless become earnest advocates of a movement which, unquestionably, is of the greatest importance educationally, and which, undoubtedly, would gradually be universally adopted and perfectly well borne, both by the sufferers and by the community at large.

DR. ARTHUR V. MEIGS said he had the greatest pleasure in listening to the exceedingly temperate and well-reasoned argument laid before the Society by Dr. Biggs.

The opinions of Dr. Meigs upon this subject were considered by him to be pretty well made up, and they continue unchanged. The extract read by Dr. Biggs from the report made by Sir Richard Thorne covered a great deal of what may be said in opposition to the registration of tuberculosis. There are two very strong arguments which may be advanced against the compulsory registration of tuberculosis. The first is that it cannot be successfully enforced; and the second is that if its enforcement could be accomplished no adequate return in improvement of the public health would result. If registration is tried in Philadelphia there will happen what Dr. Meigs believes to occur in New York, to a much greater extent than Dr. Biggs believes—failure to report cases. Dr. Meigs had been struck by the different opinions of those engaged in work in the public offices and in laboratories from the opinions of the general practitioners who come in contact with the individuals and who know how very many cases are not reported. The two reasons given ought to appeal to all physicians. He thought Dr. Biggs was wrong in his opinion that such a large proportion of physicians report their cases of tuberculosis. Dr. Meigs believes there is a general tendency to conceal or evade the report; and, if there is even the most flimsy excuse, physicians will apply other names to their cases of tuberculosis and the law will be evaded just as it is evaded in this city by not reporting cases of contagious disease belonging to that class for which the health authorities placard the houses.

This experiment was tried in Naples a hundred years ago and the laws have long since fallen into desuetude or have been repealed. Dr. Biggs and others say registration entails but little hardship, and as he describes it in temperate and persuasive language it almost tempts one to agree with him, but Dr. Meigs did not believe that registration can effect much for the improvement of the public health and he does not believe it can be successfully carried out.

Having said this much, he said he should not be true to himself did he fail to say that he did not believe consumption to be contagious in the way that Dr. Biggs and the bacteriologists believe. Dr. Meigs read a short quotation from an article which was read before the British Medical Association, and written by George Wilson, M.D., a sanitary authority in England. Dr. Meigs asked that its somewhat intemperate language might be excused: "I say that we can only fight phthisis on the old lines, by improving heritage when that is possible, by improving the homes and conditions of life and labor, which are always possible, and always call loudly for interference.

But this insane hunt after the tubercle bacillus, as if it could be bottled up in 2½d spittoons and got rid of, is the insanest crusade ever instituted on illogical lines. Bacteriologists are not sure of their tubercle bacillus, and it is a moot question whether the bacillus that is found in milk, and which is labelled as the tubercle bacillus, is not a cow-dung bacillus. A distinguished bacteriologist has admitted it; I venture to reiterate it."

In a number of the *British Medical Journal* of recent date appears a leading article "deploring the attitude of the Prime Minister of England, who, at a meeting for the prevention of consumption, at Marlborough House, presided over by the Prince of Wales, warned the medical profession not to push things too far, or to attempt anything in the way of legislation for the prevention of this disease. The speaker, in the course of his address, remarked that they would find 'the secular arm of the law in this case a delusion and a snare.'"

A little brochure from Mr. Duncan Turner, a physician in Melbourne, had been received by Dr. Meigs. It was entitled "Consumption not Contagious," and in this the author advances many arguments in support of the assertion which constitutes the title. Among other things, this man in Australia says that "if consumption is placed among the notifiable diseases, it will be the greatest blow that has been aimed at public liberty in modern times."

It is admitted by Dr. Biggs that there is a certain amount of opprobrium connected with having one's name entered upon the public records as suffering with tuberculosis, and it is a disease in regard to which many mistakes in diagnosis are made. Persons put down upon the records as suffering with the disease and who afterwards prove not to have it, may be followed for years by the sting of such a false record, and the public therefore should not be forced to submit to the system unless there is shown to be some very great gain by the improvement of the public health. Dr. Meigs was opposed to registration because he did not believe it could be made effective, nor did he believe it is carried out in New York to the extent that Dr. Biggs believes. Dr. Meigs had no direct knowledge of this, but only his knowledge of human nature. He fancied that if it were possible really to look into men's minds, more people would be found who disbelieve in the communicability of tuberculosis in the way and to the extent that has been taught by the disciples of Koch than is generally believed.

DR. J. M. ANDERS said Dr. Biggs has certainly given a calm, deliberate, temperate statement of the facts and arguments in favor of placing pulmonary tuberculosis on the list of affections returnable to the Board of Health, while, at the same time, he has been absolutely fair to those who held opposite views.

The first question to be settled is, Is tuberculosis a preventable disease? It is an accepted historic fact that there occurred a great reduction in the death-rate from tuberculosis in Italy under the so-called Neapolitan law, which included among other restrictive measures compulsory isolation and thorough disinfection, the best two methods of stamping out any of the

acute infectious fevers as well as tuberculosis. In England there occurred a reduction of 50 per cent. in the death-rate from tuberculosis during the last forty years as a result of isolation of a portion only of the persons ill of consumption. Dr. Biggs has stated this evening that in New York City there has been a reduction of 35 per cent. since the mildest measures have been instituted.

The principal source of infection is the sputum, and as that can be either thoroughly disinfected or absolutely destroyed, the question as to whether tuberculosis is preventable must be answered in the affirmative. Another question arises: Is official notification essential to the stamping out of the disease, or is it an essential part of the armamentarium for efforts to minimize the mortality rate in this disease? This is the point so well argued by Dr. Biggs and is the real point at issue.

Here Dr. Anders said that he found himself not in accord with Dr. Meigs and the authorities whom he quoted. Dr. Anders wished to see tuberculosis on the list of diseases returnable to the Board of Health, principally for the reason given by Dr. Biggs, namely, that the foci must be recognized, and by some centralized authority with sufficient power and authority to act; otherwise the source of infection will not be removed in the majority of instances. Physicians can advise disinfection, but unless entitled to a fee they cannot be expected to see that disinfection is properly carried out.

Granting, then, that compulsory notification is necessary to the accomplishment of the extinction of this disease, is it practicable? This is the question, as has been intimated, that is difficult to answer. It must be remembered that tuberculosis is an infection from which a considerable part of the population is everywhere constantly suffering. It has been demonstrated that it is entirely practicable to institute compulsory notification. In the first place it does not imply placarding of houses: it does not imply strict isolation as in the case of acute infectious fevers. Neither does it necessitate publicity of any sort.

On the other hand, compulsory notification would insure closer attention to important details, more especially in reference to the disinfection of sputum, clothing and furnishings, and more important than all, of rooms vacated by death or removal from place to place. This surveillance is especially important among the poorer classes, whom the good book says we shall always have with us, and who will probably never become sufficiently enlightened to protect their fellow-men from the dangers of infection. This perhaps is the most forcible reason for the institution of a measure of this kind. Dr. Anders, therefore, for the reasons he had stated, and those given by Dr. Biggs and others in favor of compulsory notification, expressed his approval of it, provided that the simplest measures only are employed, particularly at the outset, in order that this new law may not lead to its own rejection on humanitarian grounds.

DR. L. F. FLICK said he had so frequently expressed his views on the subject that it was hardly necessary for him to say that he was in entire accord with all that Professor Biggs had stated so admirably.

The paper of Dr. Biggs was predicated upon the assumption that tuberculosis is a communicable disease and a preventable disease. Having predicated it upon that assumption, one can scarcely go back to the discussion of the question whether or not, at least for the matter of the evening's consideration, it is a communicable and preventable disease. If it is such, then the paper of Dr. Biggs forces one to the conclusion that registration is necessary.

He has so completely covered the subject that there is nothing further to say, unless, possibly, in amplification of the points made. No man can convince himself of the necessity of registration by reading. The only way is by practical experience among the poor. Dr. Flick recently met one of the gentlemen who opposed registration some years ago, and who said he opposed the registration of tuberculosis then, but is in favor of it now because since that time he has worked to a great extent among poor consumptives and saw what he was unable to believe before, that without notification it is practically impossible to stamp out the disease. The whole matter is stated in a nutshell when it is said that by the very nature of the communicability of tuberculosis, the centre from which the disease is spread is necessarily limited and circumscribed; and, by reason of the long duration of the disease, that centre becomes more intense in its communicability as time goes on. In other words, while tuberculosis is not as intensely contagious as smallpox for the same period of time, yet, given the length of time which the disease lasts, the habitation of the consumptive does become as capable of communicating the disease as the habitation of the smallpox patient. Therefore there is just as much reason for disinfection and proper surveillance of the case of the consumptive as of the smallpox patient.

Within the last six years, in connection with the work of the free hospital for poor consumptives, Dr. Flick has had before him between six and seven hundred consumptives, who have applied for admission to hospitals. They have lived in the most unsanitary habitations of Philadelphia. The condition of these habitations has made them susceptible to contamination, and as they are habitable by the lowest and most helpless members of the community only, it is to be expected that subsequent tenants would take the disease. Disinfection of houses which are contaminated with tuberculosis is of an expensive character; not of the kind that the owner will carry out voluntarily, or that the incoming dweller can carry out, and unless the place is disinfected by the Board of Health the next occupant must take his chance of getting the disease. There is in Philadelphia, at all times, from four to five thousand tuberculous subjects. Probably four thousand are among the poor and working classes. Every practitioner will bear out the statement that all the instruction which the physician can give will never induce the poor patient to make himself innocuous to those about him nor prevent him from contaminating his house and clothing and everything about his home centre. Unless where the home centre is known and there is an efficient means of cleaning it one cannot hope to eliminate or stamp out that centre of distribution of the disease. The experience of England has been quoted

very properly to show that good does come from preventive effort. One of the points which has been advanced against registration is that nothing would come of it. History shows that this is not the case, but that good does come from preventive measures such as the removal of the consumptive poor from the home centre. There was a great reduction in the death-rate from consumption in Italy under the Neapolitan law. Because of this great reduction, the medical profession again lost their faith in the contagious nature of the disease, and through the agitation of the medical profession the law was allowed to become a dead letter. Among the people at large the belief in the contagious nature of tuberculosis was never lost.

DR. LAMBERT OTT said that Dr. Biggs' paper was of special interest to him because it confirmed conclusions which he had drawn some years ago from his medical life, which had been spent wholly in general practice, and in greater part among the poor. Of equal interest were the maps showing the fact of tuberculous cases clustered in houses. Dr. Ott bore in mind a number of houses which he has watched for years and into which he has cautioned families not to move. Families have moved into them and several have lost members from tuberculosis. He remembered one house in which a series of families lived in the course of six years and each family lost a member by tuberculosis.

He believes in the registration and isolation of cases as far as it can be humanely carried out. Registration would have this point to overcome: In the modern spirited competition and rivalry of the medical profession in order to make a living there must be a double incentive to please the patron, and the moment physicians begin to register or report one of their patients having tuberculosis and the patient learns of the fact, cordial relations would probably cease at once. That is a factor which would cause physicians to evade the act should it become a law. Dr. Ott believed for years in the fact of tuberculosis being preventable, and in its communicability. His conclusions were drawn from bedside work some time before Koch discovered the tubercle bacilli and established the law that the germ must be discovered in the patient, must be reproduced in culture medium, transferred to the animal and then this same germ discovered in the infected animal. That is one of the incontrovertible laws pertaining to bacteria and established in Dr. Ott's mind the infectious element of tuberculosis. Tuberculosis is an in-door disease and the earlier the proper regulations are instituted and out-door life is encouraged the sooner will we reduce the mortality.

DR. W. M. L. COPLIN said tuberculosis is admittedly an infectious disease; in some respects the State supervision is required in a manner resembling that employed for the care of the insane. The physician who certifies to the insanity of the patient certifies that the individual is insane and, that for his (the patient's) welfare or the welfare of the community, believes it is necessary that this individual should be confined. The same thing applies to tuberculosis. A great many individuals who understand thoroughly the necessity for care of the sputum and the possibility of communicating the disease to the family exercise the requisite amount of care. These individ-

uals require no consideration from sanitary authorities. They are to be compared in this crude comparison with those insane who are in no way a menace to those around them or to the general public. On the other hand, in the lower classes, among the poor, the necessity for care is proportionately greater than in any other class. It is absolutely necessary that they should be educated, and as has been remarked, how can they be educated by the authorities without the authorities knowing where the patient is located. Registration offers no interference to the freedom or welfare of those who can intelligently care for themselves. The advantage to be gained to the family is apparent to every physician. The education of the family may be just as important as the education of the patient, and more so. He recalled that eight or ten years ago the government appointed a commission to look into the poor districts of the cities of the United States. A representative was sent to the various cities to study conditions of ventilation and the general sanitary condition of these parts of the city. The speaker went a number of times with this gentleman, and they often secured information from the policemen who knew of houses in which individuals had tuberculosis, were familiar with nearly all the unsanitary quarters, and in this way the visitors located houses in which there was a continuous history of tuberculosis. There was on Alaska Street a house which for twenty-three years had had tuberculous patients. These foci are officially known. In the care of the house, the patient's family is protected and also the community itself.

As to the feasibility of the proposition, notification of the acute infectious diseases, such as scarlet fever and diphtheria is not carried out in absolute detail. If, in some instances, the cases are not reported, to use the same argument in regard to tuberculosis, is in the mind of the speaker highly inconsistent.

DR. J. SOLIS COHEN said he gathered from what Dr. Biggs had said that the measure has done a great deal of good and has done no harm. As a matter of sentiment the idea of registration was repugnant to Dr. Cohen personally, as it is to a great many others. When one has to consider the greatest good to the greatest number one must confess with him that the interests of the individual and the family must be made subservient to those of the community.

DR. MATTHEW WOODS said that when this question was discussed a few years ago he was one of the physicians opposed to it. Since then he has given some attention to the subject, read a good deal of the literature relating to it, and still remained opposed to registration. Indeed, in the present setting forth of the question by those in favor of having tuberculosis put upon public record, he saw but little save condemnation of that which they propose, and in their own statements.

It has been said that the chief means of communicating tuberculosis is by the sputum. Dr. Woods believes that consumption is a disease of confined animals—that is, of animals living in contracted environments where the life-sustaining elements are either contaminated or diminished. Some time

since in the Pathological Museum of the College of Physicians, Dublin, he saw an interesting collection of tuberculous lungs at one time the personal property of domestic and wild *caged* animals that had died of pulmonary tuberculosis. The series consisted of the lungs of chickens, geese, turkeys and other fowl. Also goats, sheep, pigs and cows. Wild animals *caged* were represented by the gills of fish that had died in the London Aquarium, and also the lungs of tigers, monkeys, lions, leopards, etc., which had succumbed after years of confinement in captivity.

Now the honorable distinction of being a spitting animal has been preserved and confined to man; his immemorial prerogative is the use of a pocket handkerchief, which some, it seems, would like to have succeeded by a pocket-spittoon.

How, then, can the sputum be the *main* cause of tuberculosis when these animals never spit at all? But, admitting that it is the chief cause of transmission, is that a reason for proclaiming the person *compelled* to spit a menace to the community and for diminishing his usefulness in consequence? Is that the only way to prevent the spitting nuisance—putting a tab upon a man obliged to expectorate and allowing the vile tribe of *deliberate* spitters to go scott free? Dr. Woods thought not; he believed the subject capable of a better, more humane, harmless and effective solution, and felt that we ought to hesitate long before putting the comparatively incommunicable disease on the list of registrable disorders. He further said that the arguments in favor of registration would apply more definitely to locations than to people. He still thought that not the people but the locations should be registered.

DR. SIMON FLEXNER said he had, originally, no intention of taking part in the discussion of the subject before the Society, and upon hearing Dr. Biggs' very able presentation of the subject, felt that nothing essential remained to be added. Dr. Woods' remarks, however, seemed to call for a reply. Before one discusses the subject of tuberculosis, he should have clearly in mind what is understood by that term. There can be at this time but one opinion as to its significance, namely, a disease, the pathological lesions of which occur sometimes as nodules and at other times as infiltrations, etc., the one common fact of which is the occurrence of the bacillus tuberculosis in the lesions. That other things and different parasites will produce nodular lesions in the lungs, that more or less simulate tuberculosis, is of course well known, but it is indefensible to confound such conditions with tuberculosis. It is in this way that the observations made by Dr. Woods can be brought into harmony with the knowledge of tuberculosis in man and animal. Dr. Woods' remarks that animals in a state of confinement—not in their natural condition subject to disease—develop tuberculosis, add an important argument to the data brought forward by Dr. Biggs. By them it is shown that the disease which flourishes among man and domestic animals has been conveyed to wild animals in a state of confinement. Dr. Flexner was very glad to learn that Dr. Woods admits the importance of registration of the sites of tuberculosis, and asked how such sites are to be

registered, unless through the adoption of some such measures as advocated by Dr. Biggs, in which the occupants are carefully followed? The means used by the New York Board of Health for the accomplishment of their important purposes are so mild and inoffensive as to impress no objectionable consequences upon the infected individual, while affording a high degree of protection to the healthy members of the community.

DR. GUY HINSDALE said he believed that the time has come for the Philadelphia County Medical Society to take some decided action. After hearing the case stated by Dr. Biggs and the result which has proven satisfactory in New York he believed that if a vote were taken it would be in favor of putting tuberculosis on the list of diseases returnable to the Bureau of Health. He understood from Dr. Abbott that the Bureau is in a receptive attitude, only waiting for some such message to be received before introducing the measure. If there be further delay it may be a subject of regret.

DR. ALFRED STENGEL said he considered it remarkable that when, a few years ago, the registration of tuberculosis was discussed before the Philadelphia County Medical Society it was voted down by a considerable majority and yet at the present time it is opposed by only two speakers and one of whom, at least, is an opponent to the belief in the communicability of tuberculosis, and not fully in accord with the tubercle bacillus theory, and the other one insists upon the danger of a habitating or other focus though denying the danger of the human focus. Dr. Stengel's almost unanimous endorsement of the position occupied by Dr. Biggs made him, as a Philadelphian, rather ashamed of the position that has been occupied. There is no question of doubt about the position of the medical profession on the communicability and contagiousness of tuberculosis. As far as human knowledge has shown, it is not only communicable, but mildly contagious, though Dr. Biggs very kindly puts aside the term contagious. It is a disease mainly communicated through the secretions or excretions from the lungs.

The reason why this question was previously voted down in the Society was because of fear, as said by Dr. Meigs, that the unfortunate victims might be pursued and their lives made miserable by the public authorities. Under the action of an intelligent Board of Health this could not occur. Members of Boards of Health act in an intelligent way, with an intelligent purpose, and there will be no annoyance of patients.

There is no use in advocating registration, unless it will be of some specific good. The only good it can do is to apprise the public officers of the existence of tuberculosis in certain houses or places with instruction in the means for prevention of the spread of the disease. Instead of this the physician in charge of the case might be required by the Board of Health to so instruct the patient. After the death of a patient, the Board of Health should then have authority to disinfect the premises or order such disinfection. This is the only good that registration of tuberculosis can do. Of course it would be valuable in the matter of vital statistics. Could registration secure these results without so harassing patients as to make the practitioner feel that

registration is a great hardship and that he must avoid registration even at the risk of rendering himself liable to prosecution. Dr. Stengel believes that the marvellous difference in the decrease of tuberculosis in Italy, some time after the establishment of the Neapolitan law, was due to the fact that physicians ceased to register cases. But if the law is administered in a considerate way, as it is administered by the Board of Health in this city, there is no reason why physicians should feel aggrieved at any action of the public officials. Therefore Dr. Stengel held that registration will do great good, and will not injure the physician materially in his daily vocation, and that in this city it is high time this Society should rescind its former action and should appeal to the public officials to again bring up this matter.

DR. FLICK said that Dr. Stengel was no doubt under the impression that the Philadelphia County Medical Society took adverse action some time ago on this matter. When the subject was brought up before the Philadelphia County Medical Society in 1893, the Society was almost unanimous in asking for registration. The body which took adverse action was the College of Physicians. Dr. Flick merely wished to place the Philadelphia County Medical Society in the proper light.

DR. STENGEL said he acknowledged his error. He recollected that it was the College of Physicians who reported adversely on the registration of tuberculosis.

DR. W. M. ANGNEY said the Board of Health does provide for the foci of disease mentioned by Dr. Woods. Someone is sent to the house after a death and the place is fumigated. Dr. Angney endorsed everything said by Dr. Flick about the conditions of the poor consumptives who apply for admission to the hospitals. There is the greatest need of instructions for the prevention of infecting others of the families. There is a disregard of every sanitary law.

DR. SENECA EGBERT said that the only way to gain much ground in the control of this disease is to educate the public so that each patient and each family shall be no longer a focus of infection, and that this measure of registration and the results from it will be a powerful aid in such education.

DR. H. M. BIGGS, closing the discussion, said that in regard to calling tuberculosis contagious or communicable, it seemed to him that the idea of contagion, as in relation to scarlet fever does not apply to tuberculosis, and that it would be unfortunate to introduce in the list of contagious diseases something which is entirely different from that class. All in New York have felt this, and therefore tuberculosis has been classed as communicable and not as contagious.

With respect to reporting cases, as was said before, about 10,000 cases are now reported with about 9000 deaths. It is estimated that this is about two-thirds of the cases. This gives into the care of the department about all that it can attend to with its present forces.

The position of Dr. Meigs is entirely logical. If he does not believe tuberculosis to be infectious and communicable he would not think these measures important. One or two instances will show what is constantly occurring

proving the communicability of the disease. Within the last week the attention of Dr. Biggs was called to a condition in one of the largest hospitals in New York. The patient now under the observation of Dr. Biggs had had tuberculosis for six years. He had been discharged in 1894 with the diagnosis of pulmonary tuberculosis, and since was placed in charge of one of the dormitories. The dormitory was poorly lighted and ill-ventilated, and the man had been there ever since. From the conditions, Dr. Biggs felt that there must be other cases, and upon the examination of the sixteen men occupying that dormitory at the present time, five were found with marked tubercular disease. In another hospital, in which a large number of cases of tuberculosis were treated, there often being 175 to 200 cases in the hospital, and where the conditions as to ventilation were bad, several cases of tuberculosis developed in two and a half years within the training school for nurses connected with the hospital. These are simply instances of the possibilities of communication which exist. When one looks over the city and finds the great number of houses in which numerous cases of tuberculosis develop and are reported, and allow for an increase of at least one-half as many more occurring in tenement houses in a period of five years, one has some conception of the possibilities, in the way of transmission, of the diseases and of the magnitude of the problem to be confronted.

Refractory Cutaneous Syphilis, with Report of a Case.

BY JAY F. SCHAMBERG, M.D.

[Read November 28, 1900.]

There are few diseases in which the physician has at his command such a sure and powerful remedy as mercury in syphilis. The introduction of the iodides in the treatment of this affection by Wallace, of Dublin, completed the therapeutic armament necessary to successfully combat this wide-spread and formidable disease. The treatment of syphilis with these two drugs has, within the past fifty years, been so uniformly successful that the dreaded scourge of the last century has come to be regarded as one of the diseases yielding the most gratifying therapeutic results. So far has this confidence extended that the failure of lesions to respond to the influence of mercury and the iodides suffices to cast a doubt upon their syphilitic nature. The therapeutic test has come to be universally regarded as a valuable diagnostic aid.

In the vast majority of cases mercury and its adjunct, iodide, accomplish all that could possibly be desired. In exceptional instances, however, they fail, and the knowledge of this fact is of importance, for it

places certain limitations upon the value of the therapeutic test. This has prompted me to report the following case :

Mrs. X., aged thirty-nine years, was married seventeen years ago. She has four children aged respectively sixteen, fifteen, twelve, and eleven years, all of whom are well. She had two miscarriages ten and thirteen years ago. Her family history is good, both parents being alive and well at the age of seventy.

In 1892, eight years ago, the husband manifested evidences of syphilis and soon thereafter his wife, the present patient, contracted the disease. The history given by the patient of the symptoms during this period is rather vague. In 1896, she suffered from ulcerative lesions upon the arms, legs, cheeks and nose, and "sores" in the mouth. A patch upon the foot at this time persisted an entire year despite vigorous treatment. Since 1892 the patient has never been free from outbreaks of one character or another. The manifestations of the disease have not only been extremely obstinate, but their disappearance has been invariably followed by a renewed outbreak in the same region or elsewhere.

Present Condition. The patient is a stout, apparently robust woman ; her present weight is 180 pounds. Upon the right cheek is an annular scar, the remains of a former lesion. Upon the back of the neck, arms, hands and thighs, are visible a number of irregular whitish areas exhibiting loss of pigment. This leucoderma began, according to the patient's statement, about eleven and a half years ago. Upon the extensor surface of the left elbow is a circinate dollar-sized patch made up of pea-sized, moderately infiltrated tubercles. The palmar surface of the right hand shows a papulo-squamous eruption extending in the form of the segment of a circle 6 mm. broad, from the base of the ring finger to the web of the index digit ; here the eruption winds around the lateral surface of the fingers, ending upon the middle finger the dorsum of which exhibits numerous flat and angry looking tubercles. A few tuberculo-ulcerative lesions are present upon the palmar surface of the middle finger. There is suppuration beneath the nail of this finger which is the seat of a painful paronychia. Whilst the patient is robust in appearance, her health is by no means good. She suffers from time to time from nausea, diarrhoea and cramps. She is frequently subject to headache, and complains constantly of weakness. Despite this, however, she has gained about twenty pounds in the last two years. The condition of the kidneys is normal. Since the beginning of her trouble the patient has been under more or less constant treatment. During the early years of the disease she was under the

care of a physician who subjected her to a number of courses of hypodermic mercurial injections. It appears that these did not suffice to keep the disease in check, for she had repeated syphilitic outbreaks. During the past year the patient has been treated at the Philadelphia Polyclinic. During this period she has received sixteen injections of bichloride of mercury, as high as one-half grain to the dose, and has used 110 inunctions, each containing one drachm of the unguentum hydrargyrum. The iodides were not neglected, the patient having taken as much as sixty drops of a saturated solution of potassium iodide three times a day. In addition to this she has from time to time been placed upon the protiodide of mercury by mouth, combinations of potassium iodide and the biniodide of mercury, Zittmann's decoction, tonics and reconstructives. This treatment has failed either to exert any pronounced influence upon the disease or upon the existing syphilitic lesions. The papulo-squamous syphilide upon the hand and finger, and the annular patch upon the elbow, have on several occasions almost disappeared under the use of the inunctions and injections of mercury, but just as we were about to credit the treatment with the favorable influence exerted, the eruption would relapse. Owing to the immersion of the hand in water the eruption would at times take on an eczematous appearance. Local treatment has been used almost constantly, an ointment of calomel and carbolic acid having been found to give the best results.

There are many lesions of syphilis which for a time refuse to yield to antisyphilitic treatment. This statement is particularly true of late palmar and lingual manifestations. These, however, will usually disappear under a sufficiently vigorous treatment. Whilst such lesions might be termed obstinate, they would not belong to the class designated by Fournier as "refractory syphilis." In his incomparable work on the treatment of syphilis, Fournier¹ says: "There are cases of syphilis against which all treatment is unavailing. In the absence of a better term (for the one which I employ satisfies me but incompletely) I would call such cases 'refractory syphilis.' They are cases of grave syphilis with particular malignity, which show themselves by grave manifestations and incessant recurrences, despite all that one can do. But the worst thing about these cases is that an outbreak is no sooner cured than a new one appears upon the scene, and this despite a most correct treatment. After this has been cured with difficulty, there occurs a third, and so on during long years. Such a case is the following:

¹ *Traitement de la Syphilis*, p. 548.

"This woman contracted syphilis thirteen years ago, and has always been thoroughly treated. Several times we have administered to her such an energetic treatment as to determine a considerable mercurial irritation of the mouth. Despite all our efforts she has not ceased for thirteen years to be the prey of multiple attacks of severe tertiary accidents. Quite recently she returned to our wards for the ninth time with a frightful syphilide of the face. Analogous cases would be quite easy to cite."

In July, 1899, Fournier exhibited before the Société Française de Dermatologie et de Syphiligraphie two cases of syphilis refractory to specific treatment. His report in brief is as follows: "The first patient is a woman who has had syphilis for two and a half years; during this time she has not ceased to have multiple attacks of a malignant syphilis. At first, profuse syphilides upon the skin and mucous membranes, headache, adenopathy, febrile attacks, loss of weight, anæmia, then after a few months, invasion of secundo-tertiaries afterward frankly tertiary, tubercular and ulcerative lesions affecting the face and scalp only disappearing under treatment to quickly reappear; then deterioration of health, nervous phenomena, febrile attacks and imminent cachexia. The patient has taken protiodide pills, Dupuytren pills, the syrup of Gibert, inunctions, potassium iodide (4 to 8 grammes a day), hundreds of injections of sublimate, benzoate of mercury, gray oil, and calomel to the number of forty. In addition, iron, quinine, glycero-phosphates, injections of serum, cold douches, etc." The malignity of this case was attributed by Fournier to hereditary taint, the mother having been tuberculous, and the father habituated to absinthe, and dying of cerebral disease.

Patient No. 2 was for five years subject to attacks of malignant syphilis, particularly tuberculo-ulcerative with phagedenic tendency. This patient received 180 injections of benzoate of mercury and 120 injections of calomel, without arresting but for short periods the syphilitic outbreaks.

In the patient whose history I narrate above, no hereditary taint can be invoked, as both parents of the patient are living in good health at the ripe old age of threescore years and ten. The patient is not in good health but is by no means cachectic; her 180 pounds of weight and her ruddy color disprove such a supposition. I am at a complete loss to explain the utter refractoriness of the disease to treatment.

DISCUSSION.

DR. M. B. HARTZELL said that like other men who see much of this disease, he has met cases in which the response to treatment was very slow and sometimes entirely wanting. In many it is simply a question of dose, while in the majority of cases moderate quantities of iodide of potassium produce the usual effect, exceptionally, it is necessary to give huge doses. In some cases of late syphilis, when we fail to obtain the usual effect of iodide of potassium the mercurials act most happily. In rare instances the iodides are entirely without effect. He recalled a striking case of a young woman with a tertiary lesion of the nose, in which iodides had been given in huge doses, as much as $\frac{1}{2}$ ounce of iodide of potassium a day, for a considerable period without effect. The failure was so complete as to cause doubt as to the diagnosis. Mercurial inunctions were, however, tried, and although the disease had lasted for a number of years, the lesion was completely healed in six weeks' time. Another case, that of a tubercular lesion on the chin in a young married woman, resisted treatment until $\frac{1}{2}$ ounce of iodide had been administered daily, when the lesion disappeared rapidly. Ordinary doses had absolutely no effect.

The case reported by Dr. Schamberg is one in which the ordinary treatment seems to have been absolutely without value. The reason for this failure of treatment is entirely unknown. It has been referred to by other writers, but one is entirely without knowledge as to the underlying cause.

The Treatment of Gonorrhoea.

BY EDWARD MARTIN, M.D.

[Read November 23, 1900.]

My purpose in selecting a subject of this kind for consideration before this august and honorable body was based on the assumption that it is a common disease and treated by nearly every one, and not always with entire success. It also seemed not unprofitable to myself to exchange views in regard to the therapeutics of this affection.

Without taking up the subject of etiology or diagnosis or complications, I propose simply to discuss to-night the treatment which has proved most efficacious in my own hands. It might be well to preface my remarks by stating that I have tried to keep my mind free from prejudice. I have gone back again and again. I have taken groups of cases and observed and compared them in considering the use of the internal remedies. Dr. Christian took from 30 to 80 cases similar in

nature and tried the ordinary remedies, such as salol, copaiba, cubebs, and sandal-wood oil. The fact was established as far as could be established from this limited experience that cubebs is quite useless, which is fortunate, because it is very expensive. Salol, sandal-wood, and copaiba are all helpful.

The results with my present treatment are based upon trials and re-trials. Such a personal experience may be misleading, and it is in the hope of being corrected from such errors as I may have fallen into that I bring the subject before the Society.

I have nothing to say in regard to prophylaxis, except that the measures customarily used are futile. The diagnosis I always base on microscopic examination, which takes no more than two minutes and is nearly always conclusive.

I believe the most important part of the active treatment is that which is local. When the case is presented in the first few hours, when the symptoms are not extremely severe, and usually the symptoms are severe only in those unfortunates who adopt an ill-directed irritating therapeutics, the treatment consists of hand injections with argol or protargol and irrigations of potassium permanganate.

The hand injection is ordered somewhat as follows:

Argol	6 grains.
Distilled water	3 ounces.

The patient is directed to use it with a syringe provided with a soft rubber nozzle, holding not over two drams, and with a piston which fits properly. A few drops of the solution are dropped into the meatus, which is held open, the object being to wash the follicles about the meatus, which are usually not touched at all, since the nozzle passes by. The injection is then gently driven in and held for three minutes. These injections are repeated every two hours during the day. At night and in the morning an irrigation of potassium permanganate 1-6000 is given, the patient being instructed in auto-irrigation. The best apparatus is an ordinary rubber irrigating bag holding a quart, and the nozzle which seems the most serviceable is a hard-rubber flattened cone of such size that it fits into the meatus, and by its expansion holds the fluid in if necessary.

When the disease is confined to the anterior urethra the bag is elevated not over three feet. When the anterior urethra is filled the nozzle is withdrawn and the fluid allowed to flow out—this flushing being repeated till the entire pint of solution is used. The temperature

of the solution should be about that of the body, even a little higher. The following prescription is given to the patient:

R.—Kalii permang. 3ss.
 Aquæ destil. f3iij.
 Sig. f3j t. Oj aq.

He is directed to add a teaspoonful to the pint of water, gradually increasing the strength up to two teaspoonfuls.

When the bottle of argol solution is half emptied it is again filled with distilled water. When it is again half empty it is filled again. After this the injections are repeated every three or four hours until the bottle is emptied. For six to ten days after the first week the permanganate irrigations are given only at night. If there is no discharge and the patient is perfectly comfortable the permanganate irrigations are used every other night, and in a week's time discontinued.

The internal treatment is directed toward making the urine bland. The patient is directed to take six tablets of citrate of lithia each day, a glass of water with each. For the purpose of rendering the urine antiseptic salol is given in five-grain doses not more than four times a day. The diet is that which best suits the stomach, and, barring obviously indigestible or highly seasoned articles of food, there is no material change made in the ordinary bill of fare. There is no particular restraint enjoined in regard to moderate exercise. A hot bath is directed to be taken every night. It relieves the local congestion and insures sleep. Often, not always, in twelve or fifteen days the attack is cured. Sometimes it is cured in six or eight days; and, when I say "sometimes" I do not mean as a very rare exception, but perhaps in 25 per cent. of the cases. Perhaps an equal number of the cases will be cured in from fourteen to twenty days.

A considerable percentage are not cured in that time. The complications which are so frequent under so-called more conservative treatment almost never occur. It often happens that at the end of 10 to 14 days when the injections are stopped the discharge reappears and contains gonococci. In regard to the further treatment, a resumption of the permanganate irrigations with silver injections increasing the strength of both may cure. That has not been my usual experience. I resume the irrigations but supplant them after a brief course of argol or protargol by astringent injections of the anterior urethra and for this the most satisfactory remedy is a mixture containing zinc sulphate, lead acetate and carbolic acid in water. When the gonococci are

present and numerous I use argol and protargol to both the anterior and posterior urethras as long as they persist.

Under that treatment and every other, I have seen them still present after two years, but this is rare. I have seen these cases from well-known specialists at home and abroad and I think therefore it is safe to say that a certain per cent. are beyond our present reach.

After six or eight weeks of persistent discharge the time has come for exploration of the urethra, for the searching out of the suppurating follicles and ascertaining whether or not the follicles of the prostatic urethra are involved; they mostly are. For this purpose I use the urethrometer, a dilating instrument. This is introduced for detecting the tender spots. The prostatic urethra is examined in part by the bulbous bougie. The prostate is also massaged and the purulent discharge resulting therefrom, found in the urine passed immediately after, is carefully examined.

The reason that the follicles are not cured of their inflammation is that they are full of pus and the irrigating fluid cannot get into them, hence before the irrigating fluid will reach them they will have to be emptied. The anterior follicles will be emptied by passing in the urethrometer or bulbous bougie, and the posterior follicles can be emptied by prostatic massage, so that after eight weeks of persistent treatment comes the treatment of the anterior and posterior follicles followed by irrigation, which is forced back to the bladder. The stream is first allowed to flow against the lips of the meatus, after which the nozzle is held within the meatus until the entire anterior urethra is dilated, and the resistance at the compressor urethræ muscle is overcome; thus the irrigating fluid distends the empty follicles. Instillations of argol and protargol 1 to 3 per cent. are directed to the prostatic urethra, and lead, hydrastis, and carbolic acid are given as a hand injection. Under this treatment the discharge usually disappears in two weeks, but two or three or four weeks more may be needed, and a number of cases still require three months of treatment.

There is a certain group that persist still beyond this period even for three years, and in regard to the treatment of them perhaps the urethroscope is the most valuable instrument. This instrument I have used much in nearly every one of its varieties, but in the last year have required it much less than ever before. The value of the instrument is limited to those cases characterized by polypoid or warty vegetations or isolated persistently suppurating follicles. These unfortunate cases require active cauterization. There remains a small percentage of cases uncured after a thorough trial of all recognized therapeutic agencies.

These cases wander from one physician to another, from one city to another, and finally get well in spite of neglect or treatment.

DISCUSSION.

DR. H. M. CHRISTIAN said that like many others he had used in the treatment of gonorrhœa nearly every drug in the United States Pharmacopœia and had at last settled down into a system of treatment very much like that outlined by Dr. Martin. A system of irrigation combined with the drugs named by Dr. Martin is the ideal treatment for gonorrhœa, and where it is practicable he believed it to be the very best. Personally he had found some little trouble in the auto-irrigation of patients at their homes. He had found it difficult to teach them how to use the irrigation with permanganate, and also difficult to have the patient use a fountain syringe at his home. As regards dispensary patients it is almost impossible to get them either to buy the fountain syringe or to use it when they have it, so that his plan in the clinics is to have two solutions made up marked No. 1 and No. 2. No. 1 is a solution of permanganate potash, $\frac{1}{2}$ gr. to 8 ozs. No. 2 is protargol, 10 grs. to 4 ozs. Night and morning the anterior urethra is washed out with 6 hand injections of No. 1, following this by an injection of one syringeful into the anterior urethra of No. 2, which is held there because the secret of success of protargol in the treatment of gonorrhœa is prolonged contact with the mucous membrane of the urethra.

The internal treatment practised by Dr. Christian during the inflammatory stage of the disease is that outlined by Dr. Martin. In the stationary and in the terminal stage the permanganate and the protargol are increased in strength for four or five days. Two or three weak astringents are used, such as sulphate of zinc, acetate of lead and powdered alum, and in the very last stage, sulphate of copper and chloride of zinc. Internally copaiba and sandal-wood oil are the two remedies which have decided influence upon the discharge. Dr. Christian could not see how anyone can say that internal medication has no value. Dr. Martin has referred to a series of cases in which treatment by internal medication alone was carried out. Dr. Christian considered that one of the greatest difficulties in treatment lies in the failure to localize the disease, whether there is anterior or posterior urethritis. Whatever may be thought about irrigation, or anterior urethritis, in posterior urethritis irrigation must be done.

In the treatment of chronic gonorrhœa, of course, the secret of success is in the localization of the disease: whether it is chronic anterior or chronic posterior gonorrhœa. The treatment of chronic anterior gonorrhœa outlined by Dr. Martin is believed by Dr. Christian to be the proper one. In the treatment of chronic posterior gonorrhœa he believes that massage of the prostate gland twice a week with irrigations of the whole of the urethra with nitrate of silver with deep urethral syringing will bring about the best results.

He agreed with Dr. Martin in his remarks about the urethroscope. It is under some conditions an instrument powerful for evil. The only indica-

tions for its use are sharply localized granular patches and warty excrescences. Dr. Christian has had but three such cases cured which could not have been cured without the urethroscope.

DR. RACHEL S. SKIDELSKY commended the method of treatment (irrigation) outlined by Dr. Martin, saying it was the better way, because it would tend to prevent the infection of others. It would make known to the members of the household the condition of the subject. It certainly would be preventive, and therefore should not this method be a more curative measure?

DR. MARTIN in closing the discussion said that of the drugs administered internally for this disease, he believed sodium copaibate least upsets the stomach. An irrigation of ichthyl, beginning with 1 : 2000 will sometimes cure a discharge which has lasted for months.

Cystoscopy in Women.

(EXHIBITION OF THE KELLY AND THE NITZE CYSTOSCOPES AND A TEACHING MODEL.)

BY JOHN G. CLARK, M.D.

[Read November 30, 1900.]

There are two principles of illumination involved in the chief methods of cystoscopy in women: the employment of reflected light through a tubular speculum, as advocated by Kelly, and the introduction of the light directly into the bladder, as described by Nitze. Each method has its ardent champions. In Europe, as a result of the original work and extensive publications of Nitze and the many papers and careful research work of his followers, the Nitze cystoscope is very widely employed. In America the Kelly method has likewise found many advocates who have obtained splendid results from the use of the straight vesical specula with reflected light.

As a pupil of Kelly I have passed through all of the developmental phases of his most ingenious and highly original work in cystoscopy, and am, therefore, naturally prejudiced in its favor, for, as I shall hope to demonstrate, it is capable of giving the most satisfactory diagnostic results, and is the best and the only method for local treatment. Among the clinics of Europe I found, in several, a more or less neglect of vesical diseases. In some instances they were diagnosticated in the old way and treated symptomatically, and usually when this special work was most carefully done, the Nitze instrument, or some of its modifications, were in use. In one of the larger clinics the Director

of the Woman's Hospital asked me to demonstrate the Kelly method, stating that as yet he had not been able to even satisfactorily inspect the bladder walls, much less catheterize the ureters. On entering his examining-room I found the patient upon an old fashioned table similar to that devised by Bozeman for facilitating vesical fistulæ operations, which maintains the patient in the knee-breast posture by supporting the thorax and abdomen. Of all postures, this is diametrically opposed to the principle underlying the Kelly method. Through postural means, the bladder, rectum and vagina are distended by the intestines dropping downward toward the diaphragm, thus creating a vacuum in the pelvis which causes the entrance of air into the bladder when the tubular speculum is introduced.

Upon discarding the Bozeman table and placing the patient in the proper knee-breast posture, the breast in close contact with the table and the spinal column at a sharp angle with the thigh, a perfect view of the bladder was obtained and the ureters were catheterized to the entire satisfaction of the doubting director.

While, as I have said, I am, in general, radically in favor of the Kelly method, I nevertheless, see some advantages in the Nitze cystoscope, especially for routine office examinations. The knee-breast posture at best is a disagreeable one for patients and at the first office visit it is frequently most unsatisfactory to the examiner and very disagreeable and even painful to a nervous woman. This difficulty is entirely overcome in the use of the Nitze instrument, for it can be introduced easily with the patient in the dorsal posture, and permits a most satisfactory and comparatively comfortable examination both for the physician and patient.

Many functional vesical disturbances are due to slight inflammatory changes in localized areas. The term "cystitis" according to Dr. Kelly is very rarely applicable to even marked inflammations of the bladder, for, as usually employed, it signifies a more or less universal involvement of the mucosa. Instead, however, the inflammation is usually confined to limited areas and most frequently to the trigonum. Dr. Kelly has, therefore, coined the word "trigonitis" to designate this special localization of cystitis. In the past it has been the custom to assume that a woman suffering with dysuria or pyuria of long standing had a general cystitis. This blind acceptance is erroneous, and treatment in such a case by general irrigation is frequently totally inadequate, for, it is not general irrigation, so much as direct local applications that are indicated. If we accept the principle that "he who diagnosticates well, treats well"—every patient suffering with vesi-

cal difficulties of longer than an acute attack should be subjected to a careful cystoscopic examination. For this preliminary examination I find the Nitze apparatus adequate, and thus I have been able to make a satisfactory practical combination of the Kelly and Nitze methods. After having obtained a definite knowledge of the topography of the bladder, especially as to the localization of the points of irritation or inflammation, and as to the appearance and condition of the ureteral orifices, I at once resort to the Kelly method for the further treatment of the case. With a good reflected light, which is taken from an electric or other condensed light, one can make topical applications solely to the inflamed areas without any involvement of the normal parts of the bladder. In this treatment the patient must necessarily assume the knee-breast posture, but, by the time it is instituted, the patient will have made one or more office visits, and the strong antipathy to the posture will, to a considerable extent, have been overcome by the necessity which she recognizes for treatment.

In catheterizing the ureters, I usually follow the Kelly method, although I find the Nitze catheterizing apparatus quite satisfactory. Not infrequently, when pus is issuing from an ureter, the variation between the clear urine ejected from the normal and the milky fluid from the diseased side, as seen with the Nitze instrument, is amply sufficient to restrict the attention entirely to one side.

For cystoscopic examinations, a special room, capable of being darkened, should be provided, both for the Kelly and Nitze methods, and when possible, a street electric current should be utilized for the illumination. When this is not feasible, a good storage battery will answer all purposes.

In conclusion, I may summarize by saying that for preliminary office examinations, the Nitze method is very satisfactory, and for treatment, and in many instances for diagnosis of renal diseases, the Kelly method is the superior and only practical one.

DISCUSSION.

DR. C. P. NOBLE said he had had considerable experience with the Kelly instrument, but had never used the Nitze cystoscope. There is no question but that the introduction of the cystoscope has greatly aided in the treatment of diseases of the bladder and also in the diagnosis of the ureters and kidneys. In the treatment of bladder cases he felt that it is the duty of all to examine cases and make a diagnosis with the cystoscope, whether the Nitze or the Kelly instrument is used. There is no question of the great advan-

tage of the Kelly instrument over all others because only through that can topical applications be made to the bladder.

DR. A. J. DOWNES said that while in Berlin he was surprised to find every clinic equipped with a cystoscope and a catheterizing cystoscope of the Nitze pattern. Many seem to be able to use these instruments and he was surprised to see the ease with which the ureters are catheterized. He found it extremely easy to diagnose the condition of the bladder with a Nitze cystoscope. They have in Berlin a light weight and exceedingly good storage battery, which will last a long time. Dr. Downes has used Kelly's method since 1896 and realizes that it is the most valuable method and was surprised to find that it is hardly understood in Berlin. He asked more than one man there how he treated the bladder. They usually make little treatment except with the snare and cautery. The Nitze cystoscope is, as Dr. Clark says, the best method by which one can on the first visit inspect the bladder of the patient and make a diagnosis, but with it it is absolutely impossible to perform any kind of treatment.

DR. B. C. HIRST spoke of the advantages of the Pryor cystoscope, which he had not heard mentioned. He had used the Nitze, the Kelly and the Pryor instruments in his office for the last three or four years and he thought that Pryor's cystoscope is rather the best. It combines the advantages of Nitze's and Kelly's. It has the cylindrical tube of the Kelly cystoscope so that as with Kelly's instrument one can diagnosticate the conditions and treat them at the same time. Anyone who investigates the merits of this will be as pleased with it, as has been Dr. Hirst, who uses it to the practical exclusion of the other two.

DR. GEORGE ERETY SHOEMAKER said that in this connection that there is some dread of a cystoscopic examination on account of possible injury to the urethra. There is no necessity for using a large instrument, a ten millimeter instrument is quite as large as is necessary in the diagnosis of most conditions of the bladder and the treatment of most cases of inflammation. Such an instrument as that shown by Dr. Clark can do no injury from stretching, nor can it produce fissures. It is not extremely painful to use, especially with a little cocaine.

DR. CLARK closing the discussion said he was impressed, while abroad, with that of which Dr. Downes spoke. Frequently, even though a good diagnosis is made, no well defined treatment is established and no attempt is made to carry local treatment into effect. Dr. Clark remembered in one instance asking the chief of one of the clinics concerning his results and opinions as to the treatment of cystitis. He shrugged his shoulders and said practically that he had paid so little attention to the treatment that he had no well defined opinion as to the best therapeutic methods.

With regard to the remarks of Dr. Hirst, Dr. Clark said, the objection which he found and the one which caused him to resort to the Nitze cystoscope, is that the Pryor apparatus requires the knee-chest posture. He has not used the Pryor instrument but he agreed with Dr. Hirst that it is an extremely ingenious apparatus and should be in the hands of every specialist.

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**Resection and Suture of an Ulnar Nerve, with Immediate
Restoration of Function; Exhibition of Patient.**

BY ERNEST LAPLACE, M.D.

[Read December 12, 1900.]

Seventeen months ago this boy, sixteen years old, fell from a distance on an axe, severing the ulnar nerve and causing complete ulnar paralysis. Nothing was done for the healing of the wound but local treatment of the joint. There followed the usual ulnar atrophy. The boy came to me last Thursday and was operated upon on Friday morning. The lower part of the ulnar nerve was found embedded in a fibrous mass, and not being able to find the upper portion, a dissection was made above and it was found that the mass not before recognizable was the neuroma, the extremity of the upper portion of the nerve. Fully one-half inch was resected from the lower portion of the nerve. Before it was contracted by the alcohol it was a quarter of an inch longer than it is now. The two edges of the nerve were brought together. Splicing was thought of, but a gentle stretching was done. The end of the nerve was secured with the forceps and pulled with my fingers strongly and steadily for two minutes. The same thing was done with the under portion until the proper length of nerve tissue was obtained. The nerve was in good apposition, but my object was to bring these two extremities ideally together. Ten sutures were put around the nerve with the finest possible needle and silk. When sutured, it was difficult to tell that the nerve had been resected.

It did not occur to me then to look at the hand. It was wrapped up in an antiseptic towel and the boy was sent back to bed. On Saturday morning as I was passing through the ward at about a quarter to nine o'clock I, accidentally, saw that the boy was moving his little finger,

and hardly believing what I saw, I told him to try to move the finger. He moved it up and down as if it had never been injured. Before operation it was contracted and there was loss of sensation and motion. As the healing process cannot take place in so short a time and the motion was as good a day after the operation as it is to-day, I concluded that the restored motion was the result of the perfect and accurate contact of the nerve extremities which enabled the nerve force to travel through. I am sorry that I did not think of observing the fingers immediately after the operation.

There is a curious phenomenon in the difference between the restoration of motion and of sensation. Motion is perfect, while sensation is not so perfect. At the tip of the finger he feels a prick of a pin 1 mm. away from the spot of a former prick. In other words, so far as sensation is concerned, the conditions are different; every nerve fibre is an educated fibre and responds to a special message. No matter how accurately the nerve is brought together it is not possible to suppose that each fibre has been brought into contact with its former fellow. Those which have met their former fellow respond to their educated sense.

I thought it interesting to show the case which so far as I know is one of as rapid restoration of function as has been reported. I believe Dr. T. S. K. Morton's case approaches it as nearly as any of which I know.

DISCUSSION.

DR. F. SAVARY PEARCE expressed his pleasure at seeing the patient of Dr. Laplace, and thought the sudden restoration of power, both motor and sensory, in such a case illustrated very well the theory, which may be a fact, that the so-called neural energy, is some natural form of motion, probably electricity, and that the nervous system is nothing more than the highest possible development of an electric apparatus. When restored function is obtained, as in this instance, before healing had taken place, the operation must have brought about physiological restoration similar to the attaching of wires to re-establish a broken current. Electricity may be, therefore, the so-called physical force which is so often styled neural energy, etc.

DR. H. A. HARE referred to the experiments of Victor Horsley of leading off energy from the spinal cord and registering it by a capillary electrometer.

DR. H. R. WHARTON referred to a case, in the Presbyterian Hospital, of excision of the ulnar nerve in which the assistant had stretched the nerve, and in which restoration of sensation seemed to be complete.

DR. J. B. MANN stated that he witnessed the operation done by Dr. Laplace, saw the neuroma, 1½ inch in length, which was removed, and also saw the portion cut from the distal part of the nerve, about ½ inch in length.

The splicing of the nerves which he had, hitherto, seen had usually been overlapping. Sensation and motion had not returned as rapidly in these as in the case reported by Dr. Laplace. He thought probably this would teach the advisability of joining the nerve end-to-end rather than by overlapping. The sutures in Dr. Laplace's case were not carried far from the severed ends of the nerve, and he had feared that on this account the nerve would pull apart. He believes, however, that if plaster-of-Paris splints are employed, as in Dr. Laplace's case, there will be little danger of pulling apart, even if the sutures are not carried far from the severed ends of the nerve. In this way, too, the nerve will be less interfered with and the prospect for a better result increased.

DR. LAPLACE, in closing the discussion, referred to the point that the nerve was not spliced, but stretched, and that a distance of $1\frac{1}{2}$ inches was covered by this stretching. In regard to the doubt as to the nature of the axis cylinder, Dr. Laplace thought that a case like this with immediate restoration of function tended to prove that the axis cylinder is really a liquid or semi-solid. If it were a solid, in drawing it this long distance there would be some laceration and there would be no continuation of force. If an elastic tube full of water or other fluid is stretched, the contents of the tube remains still unbroken and therefore continuity is maintained. He thought this case an argument in favor of the semi-solid or gelatinous nature of the axis cylinder.

He emphasized the fact that the case was a chronic one, there being seventeen months interval from the accident to the operation, which was followed by immediate restoration of function.

Lymphatic and Portal Infections Following Appendicitis.

BY JOHN C. MUNRO, M.D., of Boston, Mass.

[Read, by invitation, December 12, 1900.]

The group of cases that I wish to report, cases of infection of the retroperitoneal lymphatics and of the portal vein and its tributaries, originating in appendiceal inflammations, is one of great interest and importance to the general practitioner as well as to the surgeon. The latter is not likely to see these complications following appendicitis at so early a stage as the family doctor, and it is for the early interpretation of the symptoms that the surgeon must plead, in order that operation, if it can be of help, shall be undertaken before it is too late.

The infection of the retroperitoneal lymphatics I believe to be much more frequent than is commonly recognized; that is, an infection which has advanced far enough to cause marked disturbance or to require

surgical intervention. We all know how serious the extreme cases of infection may be, as shown in abscesses about the diaphragm, pleura and lungs. It is not to these, but to the midway cases that I wish to call attention, the cases that make the old-fashioned perirenal abscesses, the sinuses in the loin or groin, or where the process, stopping short of abscess formation, makes the patient a chronic invalid. Furthermore, that such a lymphatic infection may break out at a time remote from all evidence of acute appendiceal trouble should be borne in mind and should not put the diagnostician off of his guard.

The diagnosis of a portal phlebitis is well recognized post-mortem, and the pathology has been known for years; it is to try to assist in the more important recognition of the condition during life and early in its career that I shall report some of the cases that have helped me, more through my own blundering, to be on the outlook for these complications and to detect them. As I watch case after case of appendicitis I am sure that, more and more, I see evidences of either a lymphatic or a portal infection or both. An acute case, draining well, and in every other way on the high road to recovery, but with a persistent elevation of temperature, indicates to me, first of all, one of these infections. Of course, extraneous and independent complications in the chest, kidneys, pelvic organs, etc., must be first excluded. When with this failure to follow the usual course I find a spasm and tenderness, perhaps slight, in the region of the kidney, I regard it as strong evidence that the lymphatics are more or less seriously invaded. Frequently a few hot poultices will disperse the infection and the symptoms will disappear.

When the patient, however, has evidence of a more acute infection as shown by chills, more or less jaundice, hepatic tenderness and general malaise I feel that we are dealing with a condition much more serious, and due to a portal infection. I am sure that occasionally I have seen a patient recover from a mild invasion of this nature; but on the other hand, when it once attains a certain limit the outlook is almost hopeless, certainly so without operation.

Moreover, whether there is palpable evidence of appendiceal trouble, present or remote, I have come to regard every case of hepatic tenderness in a septic patient, whether attended with jaundice or not, as a possible portal phlebitis until it can be proven to the contrary; this might be carried farther, in light of the difficulty, at times, of demonstrating an appendiceal origin when present, by affirming that one should regard any obscure, septic, hepatic infection as most likely due to an appendicitis. There are, of course, many other conditions that

can simulate this one, but I believe that it is erring on the side of caution to hold the appendiceal origin always in mind.

The pathology of the retroperitoneal infection is well demonstrated in that most complete and satisfactory chapter on the pathology of appendicitis by Dr. A. O. J. Kelly in the second edition of Deaver's *Treatise*. He says that retroperitoneal abscesses "may also develop, although the appendix be situated intraperitoneally, if the perforation occur into the meso-appendix. Under such circumstances the liberated infectious material dissects its way between the two layers of the meso-appendix, and finally reaches the connective tissue where the abscess originates. It is quite likely also that, in the absence of perforation some retroperitoneal abscesses may be produced by virulent infectious material being carried by the lymphatics of the meso-appendix to the retroperitoneal connective tissues."

It is to the latter mode of infection that I wish to draw attention rather than to direct perforation of an already existing abscess through the subjacent posterior peritoneum; the latter form and the posterior infection due to an appendix originally situated retroperitoneally is, perhaps, more common in the experience of all of us, and one must confess that clinically it is at times impossible to differentiate between the various methods of invasion. To-night I wish to emphasize merely the clinical side of the picture without going into the literature or the pathology of this class of cases.

To illustrate the retroperitoneal type of infection I will briefly report some of the most characteristic cases that I have seen.

CASE I. A physician had had several well-marked attacks of appendicitis and was constantly complaining of soreness and tenderness. A twisted chronically inflamed appendix was removed and the wound closed. The condition of the appendix did not seem to account for the severity of the symptoms. Convalescence was smooth and uneventful, the pulse and temperature being normal for a fortnight, when without warning the patient developed high fever, spasm and tenderness in the loin and to the outside of the scar. Under ether, a short incision was made alongside the scar to explore its deeper portions without disturbing the sutures, and everything was found aseptic. A second opening was made farther back in the loin into the retroperitoneal cellular space and an active lymphangitis with a little pus was found entirely behind the peritoneum and without any connection with the abdominal cavity. Under drainage the trouble rapidly cleared up. Infection may have taken place at the time of the first operation but the tissues most likely to show such infection, the line of the wound and the peri-

toneum, were healthy, and, in the light of other cases, I have felt that he for a long time had had lymphatic infection from his constantly recurring attacks of appendiceal inflammation which finally manifested itself in this way.

To demonstrate this better let me briefly mention a case that I saw with Dr. George E. Brewer, of New York, which he has reported in detail in the *Annals of Surgery* for September, 1898.

CASE II. A man, fifty-six years old, early in a first attack of acute appendicitis had the organ removed, the abdomen being closed without drainage. Some pain and vomiting followed for a day or two but otherwise the convalescence was fairly satisfactory until about a month later, when pain in the side and malaise appeared. These symptoms disappeared after rest, only to reappear again and again on slight provocation. The temperature was almost constantly a little above normal. This continued for nearly three months. At the second operation there was spasm and a mass in the right loin extending nearly to the median line and to the iliac crest. Râles, which a short time before had been heard at the base of the right lung, had disappeared. The patient looked slightly septic. An anterior incision showed no active intra-abdominal inflammation, but behind the peritoneum an indurated mass could be felt lying in the region of the retroperitoneal lymphatics. A posterior opening showed a small abscess lying in the midst of the mass of induration which was curetted and drained. Steady and permanent recovery followed. Here the infection undoubtedly began at the time of the original acute attack and persisted until relieved by the free posterior drainage.

CASE III. Last spring I saw a case with Dr. Moir, of South Framingham, in a young farmer whose appendix had been removed about ten days after the beginning of one of several attacks. Very little acute trouble was found in the abdomen; a few tough adhesions but no abscess. The appendix was removed and the wound partly drained. Following operation, chills, septic temperature and sweating had continued. When I saw him the wound and the abdomen were negative, but in the flank were tenderness and spasm. An incision in the back showed a large retroperitoneal abscess entirely separate from the abdominal cavity and evidently originating from the lymphatics.

CASE IV. Another case of less definite origin illustrates the likelihood of an appendix being the source of a severe perirenal abscess. A woman, fifty years of age, was seen with Dr. Ham, of Dover, with a history of progressive illness and tumor in the right loin for about two months. On cross-examination it was found that she had suffered for

several years from attacks of pain in the region of the appendix, not severe enough to confine her to her bed, but causing soreness, tenderness and malaise; apparently, repeated attacks of mild appendicitis. When I saw her she was yellowish and septic looking, nervous and feverish and somewhat emaciated. There was induration along the iliac crest merging into a mass in the upper portion of the iliac fossa and toward the region of the kidney. Incision into the retroperitoneal space revealed a large abscess cavity full of foul pus containing streptococci in pure culture, entirely behind the peritoneum and, so far as could be determined, originating in the lymphatics. Under drainage she soon recovered.

That a retroperitoneal infection can lie dormant for a long time is shown by the following case, although there was every reason for an acute flare-up at any time.

CASE V. In November, 1897, I operated for acute appendicitis in a healthy girl, fourteen years of age, on the sixth day following the onset of symptoms. A gangrenous appendix lying in the iliac fossa and a secondary abscess in the pelvis with a gangrenous tube was found. Satisfactory recovery followed under drainage and the patient had returned to school apparently as well as ever, except that she noticed that she was apt to have some pain in the right thigh if she ran up a flight of stairs. Eighteen months after operation pain reappeared in the right iliac region with tenderness and spasm. Careful examination showed that the tenderness and fulness hugged close to the iliac crest and extended toward the loin, but without any evidence of a peritonitis. Not daring to ignore the possibility of an intra-abdominal infection a very small opening was made through the rectus to the inside of the scar. The peritoneal cavity showed no evidence of disturbance, but behind the peritoneum in the groove between the psoas and iliacus was an abnormal swelling. The abdomen was closed, and through another incision close to the crest into the retroperitoneal space, the peritoneum was pushed forward until a small cavity containing stinking pus and a small concretion was opened and drained. Evidently the concretion, not detected at the first operation, had perforated the posterior peritoneum and quietly lain there for a year and a half before causing the secondary retroperitoneal infection.

CASE VI. Two days later a strikingly similar case came under observation, and though there is lacking the positive evidence of operative proof of a retroperitoneal lymphangitis the clinical evidence is so strong to my mind that the case will bear reporting. A healthy boy, ten years old, was seen ten days after the onset of an acute appendicitis.

A foul, superficial abscess cavity with a gangrenous appendix was found and drained. Rapid and satisfactory recovery followed and the boy went back to his sports and to school as well as ever. Ten months later after a game of base ball he had an attack of malaise and abdominal pain. He steadily grew worse, and, when I saw him again, he had a high temperature and rapid pulse and looked very septic, but not peritonitic. Examination showed a marked tenderness and spasm in the right flank without evidence of any intra-abdominal trouble. Lumbar incision was urged but was refused on the advice of an irregular practitioner who was in charge of the case. The boy slowly recovered, however, after a serious illness and was around again apparently as well as ever. Since then, eighteen months after my last visit, he has had two similar attacks, in the latter of which, about two months ago, he was so ill that his life was despaired of for several days. The irregular in charge still refuses to consider any operative measure and relies on the boy's ability to fight sepsis. Clinically, there has never been any question in my own mind that there is a persistent, retroperitoneal lymphangitis, originating at the time of the acute appendiceal infection which he has been able to overcome in the old-fashioned way—a risk that it is unjustifiable to take.

CASE VII. A somewhat similar case, showing the ability of a patient to overcome sepsis here as well as elsewhere, came under my observation at the Boston City Hospital. The patient, a man twenty-six years old, was operated upon by Dr. Burrell for a severe appendicitis followed by fecal fistula which closed spontaneously at the end of three months. Two weeks later the fistula reopened and then closed for a few days, only to again reopen after a chill and high fever. In a few days, a definite, tender mass could be felt in the loin and the patient continued to have marked febrile temperature and pulse, although there was no evidence of any lack of free discharge from the abdominal sinus. For various reasons an operation was inadvisable, and under poultices and liberal diet the cake in the loin slowly disappeared and the temperature fell to normal, the fecal fistula finally closing at the end of a month. There has been no return of symptoms, now over two years.

From rough clinical data, by no means as accurate as they should be, I am strongly inclined to believe that cases of appendicitis, both before operation and after thorough drainage, that exhibit either marked hyperpyrexia or persistent elevation of temperature have a more or less extensive lymphatic infection either from an appendix originally retroperitoneal in position or from direct or indirect septic invasion from an intraperitoneal, inflamed appendix. The ordinary acute case

of appendicitis does not have a persistent high temperature especially after adequate drainage, and in many of these a careful examination will show fulness, tenderness and spasm in the right loin. A case illustrative of this came to my care recently.

CASE VIII. A little girl with a very severe type of acute appendicitis was operated upon by my colleague, Dr. Lund, and the abscess thoroughly drained. The temperature fell somewhat, but continued steadily above normal in spite of the proper drainage. Soon a spasm and tenderness in the loin was detected and under ether I explored the retroperitoneal space. Here I found a double chain of enlarged glands, each about a half-inch in diameter, one of them being surrounded by granulation tissue but without any definite abscess. Of course the operation was of no benefit. The pulse and temperature continued above normal for a while and gradually fell under abundant feeding, sunlight and good care. Here the lymphatic infection must have extended far beyond the region of operation, the patient being able to overcome the general infection before the glands softened down into pus. We find an exactly similar condition in the lymphatics elsewhere in the body, and although it is very evident that a good proportion of such retroperitoneal infections may subside under general systemic treatment, it is better in cases of doubt, or where there is evidence of purulent softening to make a small incision and drain.

To recapitulate, an exaggerated febrile condition before operation and a persistent one after drainage should suggest a lymphatic infection beyond the ordinary, whether due to an appendix originally retroperitoneal, to an abscess that has already perforated the posterior peritoneum, or to a lymphatic infection pure and simple following an intra-abdominal abscess.

Portal Infections. Another complication secondary to appendicitis that is not so very uncommon, is portal pylephlebitis with abscess of the liver. Its pathology is well understood and need not be discussed here. Its clinical history is often very obscure, and of intense interest, and although it is one of the gravest of the sequelæ that we have to deal with, I believe that it is not necessarily always fatal.

Dr. Henry Jackson has reported in detail, in the *St. Paul Medical Journal* for 1899, ten cases definitely due to an appendicitis; in addition to two cases seen with Dr. Jackson and to which I will briefly allude I will report several more illustrative of the clinical signs.

CASE I. The first case of which I have notes, was operated upon in August, 1896, for an acute appendicitis, one of several attacks, and drained in the usual way. The temperature fell to normal in about

seven days, that is, later than would be expected, and the sinus was closing rapidly when between two and three weeks from operation the patient became ill, with rise of temperature, malaise and vomiting, followed by chills. The spleen was enlarged. The chills and vomiting continued and various infections, malarial, gonorrhœal, from endocarditis, etc., were considered and ruled out. About two weeks from the beginning of the secondary trouble, pain and tenderness were noticed under the right costal border. These increased, and in a few days the liver was explored through an incision in the right hypochondrium. The peritoneal cavity was found normal except for a swollen right lobe of the liver. The latter was explored twice with a trocar with negative results. The pleura was also explored through the sixth space with negative results. The abdominal wound was closed and on the seventh day it was found clean and aseptic, but on the eighth day it opened spontaneously discharging much foul pus and bile. Marked improvement followed for a week, when he had a severe relapse of the chills, accompanied by cough and foul expectoration. This was again followed by a fresh outflow of pus and bile. The pulmonary symptoms continued together with a profuse hepatic discharge, but gradually improvement set in and by the middle of November, two months after the original operation, he was practically well, and has continued to remain so up to the present time, four years later. He was by far one of the severest cases of illness that I have ever seen recover; the good nursing in this case deserving all possible credit.

A year later I saw a case with Dr. Jackson, and reported by him, which was very instructive.

CASE II. A man, twenty-one years old, had recovered from an attack of acute appendicitis without operation three years before. He remained well up to a few days before entrance to the hospital, when he suffered from an attack, apparently, of appendicitis followed by sweating, chill, headache and delirium, and other signs suggestive of meningeal disturbance. The local signs of appendiceal trouble cleared up, but he developed a jaundice and loss of flesh while the chills persisted. At this time I saw him with Dr. Jackson and on the basis of a probable diagnosis of abscess of the liver, aspirated without finding any pus. At this time there was a leucocytosis of 19,000 and the appendix symptoms were in abeyance. No improvement followed, and at autopsy, ten days later, a gangrenous appendix was found, a septic thrombus and pus in the portal vein and its tributaries together with abscesses in the liver. I did not realize nor appreciate the relative importance of his earlier appendiceal symptoms when I saw him; had I done so, and

operated at once, draining the iliac abscess and freely draining the liver, the outcome might probably have been different.

Eight months later I again saw a case with Dr. Valentine and Dr. Jackson in which an appendicitis was strongly felt to be the origin of hepatic abscesses, but we could find no evidences before death to warrant an exploration.

CASE III. A man, thirty-eight years old, had lost flesh for a year past. Two weeks before I saw him he had general abdominal pain, vomiting and diarrhoea. Then followed irregular chills, coming on every day or two, later increasing to one or two, daily. There was emaciation, jaundice, enlarged spleen, a lax abdomen without tenderness except over the liver, that was somewhat enlarged. Careful examination in the region of the appendix failed to show any evidence of trouble there. Unfortunately a rectal examination was not made. Exploration was advised if improvement did not result from forced feeding, stimulation, etc. The patient did improve unfortunately, the liver decreased and the jaundice and chills abated until seven days later, when there was a severe relapse, and the patient growing too ill to warrant interference, died. Autopsy showed an enlarged liver with wide-spread purulent infiltration, no general peritonitis but adhesions in the right iliac fossa surrounding an adherent, friable appendix with a few drops of pus.

In looking back to this case, I can see no excuse for not operating, even though no evidence of an appendicitis was obtainable. To be sure the process had advanced so far that recovery would have been doubtful. As it was, we did not feel justified in exploring without a more definite knowledge as to the causation than could be obtained without opening the abdomen. Nowadays there would be no hesitation in urging an exploration.

Diagnosis is not always easy when one has definite knowledge of the probable origin, as shown in the following case that I saw with Dr. Burrell:

CASE IV. A man, forty-two years of age, was operated upon in Dr. Burrell's service for acute appendicitis, the wound being drained and the appendix not being found. Locally, the progress of the case was satisfactory, but between two and three weeks after operation the temperature became irregular with wide variations, and there was a leucocytosis of 15,600. At times the temperature would remain normal for twenty-four hours, then shoot up to 104°; there was increasing pallor, loss of flesh and apathy. Five weeks after operation, the leucocytosis fell to 9800, but owing to some resistance in the right hypochondrium

the liver was aspirated with a negative result. Soon chills began to appear with leucocytosis and jaundice which lasted only a few days, followed by pallor. The patient steadily grew weaker, abdominal distention that had been slowly coming on, increased and he died two months after operation. Autopsy showed the appendix, cæcum and ileum bound together and overlying a small abscess. The retroperitoneal lymphatics were enlarged, several being softened; numerous abscesses in the liver; acute suppurative pylephlebitis; acute renal phlebitis, etc.

That cases of portal phlebitis may be confounded with cholecystitis is shown in a case that I recently saw with Dr. Thorndike and Dr. Nichols.

CASE V. A man, thirty-eight years old, had suffered several years from indigestion. Eight months ago he had had an attack of appendicitis, recovering without operation. Three weeks before entrance to the hospital he had an attack of pain in the region of the appendix which soon shifted to the right hypochondrium. For two weeks he had been jaundiced. At entrance there was a leucocytosis of 39,000, jaundice, and a localized area of extreme tenderness over the region of the gall-bladder; elsewhere the abdomen not being especially tender. On the following day he had a chill which was repeated on the two succeeding days when Dr. Nichols operated for a cholecystitis, finding adhesions of the parietes, intestines and liver, and a thickened gall-bladder which contained a viscid mucus, like inspissated bile. The liver itself was dark, somewhat congested and enlarged, but no abscesses were noticed. The patient did not improve after operation. Closer examination shortly after this, that revealed appendiceal tenderness both on abdominal palpation and rectal examination, together with the history of his preceding attack of acute appendicitis and several attacks of probable subacute appendicitis led to the diagnosis of a portal phlebitis with hepatic abscesses, which was confirmed at a partial autopsy a few days later. In this case the true condition could be determined only after the more rational diagnosis of an acute cholecystitis had been ruled out by operation.

Finally, to illustrate the possibility of making a diagnosis, I will report a last case of a young girl, seventeen years of age, who entered the hospital with a history of sudden, sharp umbilical pain, coming on ten days before, with vomiting that lasted for two days. There was also moderate diarrhoea. Four days before entrance there was dull continuous pain in the hepatic region followed by chills and sweating, and a leucocytosis of only 9000. A tumor without tenderness could

be felt below the costal margin on the right, and the enlarged spleen was palpable on the left. The chills persisted; tenderness and spasm over the liver developed with doubtful jaundice. There was nothing to call attention to the appendix until deep pressure was made, when one found distinct, local, tenderness without involuntary spasm. On that basis, and from the fact that she was growing worse I operated, opening the abdomen over the liver, and found on the upper surface of the right lobe several groups of small abscesses which were freely opened and packed with gauze. No large, deep cavities were found. Investigating the region of the appendix, I felt enough to warrant a second incision which exposed a foul, stinking abscess cavity which was drained. Two days later the appendix wound was sweet and clean and required only a small wick; from the liver, pus with a foul odor was discharged on removing the packing. On the third day the patient, who had been doing well, suddenly grew worse with high pulse and temperature and died on the fifth day after operation. No autopsy could be obtained.

As deductions, and to aid in discussion, I will offer the following suggestions:

1. That the retroperitoneal lymphatics are probably always infected to some extent in inflammation of the appendix, the degree of the infection not necessarily depending on the extent of the appendiceal inflammation; a mild, chronic appendicitis at times giving rise to a severe lymphangitis.

2. That the lymphatic disturbance may date its origin from an appendicitis occurring many months beforehand.

3. That a lymphatic infection severe enough to warrant local treatment is rare when compared with all the cases of appendicitis, but that such an affection is probably more common than a portal infection.

4. That mild infections of both the lymphatics and of the portal system may yield to medical treatment.

5. That persistent fever, without other evident cause, should suggest one or both of these infections.

6. That spasm, tenderness, and later, fulness, in the right loin should indicate a retroperitoneal infection from some source or other, possibly due to an appendicitis, though due in many cases to renal, hepatic, pleural or other lesions.

7. That chills and hepatic tenderness, associated at times with jaundice, may be of appendiceal origin, and that this origin, especially in obscure cases, should be sought for most carefully in physical examination, in the personal history, and, if necessary, in abdominal exploration.

8. That drainage in the loin gives prompt and satisfactory relief where pus or even a diffuse cellulitis has formed.

9. That prompt and thorough drainage of the liver together with removal of the inflamed appendix, offers the best means for recovery from septic infections of the liver.

10. That aspiration of the liver is an imperfect, unsatisfactory and unsurgical procedure. Abdominal section with definite, free exploration of the liver and free opening of all abscesses within reach is far more satisfactory, not difficult, and less dangerous than aspiration.

DISCUSSION.

DR. H. A. HARE said that Philadelphia physicians are so accustomed to being reminded by their surgical friends that they know nothing of appendicitis that only his desire to respond to the call of the President gave him courage to open a debate upon a theme over which so many battles have been waged.

The facts so well emphasized by Dr. Munro in regard to secondary lesions, hepatic or lymphatic, arising from appendicular disease have not heretofore received the attention they have deserved. A study of the anatomy of the parts involved would lead one to suppose an even greater frequency of the occurrence of these complications than his statistics indicate, for the circulatory connection both by the bloodvessels and lymphatics is most intimate, and by this means widespread glandular infection may be caused. Pause was made for a moment to show a diagram illustrating these familiar anatomical facts. Upon the diagram it was shown that the appendicular branch of the ileocolic vein anastomoses with the superior mesenteric vein which in turn forms the splenic vein to form the portal trunk and therefore by these very direct pathways infection may be carried directly to the liver.

Again, in the case of the lymphatic system, general systemic infection would be even more readily produced, were it not for the action of the local glands through which infection has to pass. It will be recalled that the lymphatics of the cæcum and ascending colon pass between the layers of the mesocolon to the mesocolic glands from whence the lymphatic vessels empty into the receptaculum chyli. Dr. Clark will discuss the absorption and direction current of the lymphatics. The interesting manner in which the glands wall off the rest of the system from infection is well known to all. In this connection it is interesting to note that the vascular supply of the ovary and appendix is quite closely connected. Thus, the appendicular artery anastomoses with the ovarian artery by a branch in the appendiculo-ovarian ligament, and as the venous circulation corresponds very closely to the arterial it can be readily understood how it is possible for disease in the appendix to cause secondary infection of the ovary or even of the Fallopian tube. This occurrence did take place in a patient in Dr. Hare's practice who was operated upon by a distinguished member of the County Society.

The operation was deferred by the family until frequent attacks absolutely necessitated surgical interference, and the operation was performed, of necessity, during an exacerbation or acute attack of the disease. The operation revealed the fact that the appendix contained a moderate-sized abscess, but notwithstanding the greatest possible precaution to prevent its being ruptured in its removal, the abscess wall broke just as the appendix was removed. Careful preliminary precautions had, however, been taken in the event of rupture of the abscess, and it was believed that all surrounding tissues had been carefully protected from infection. The patient did well for a short time after the operation and then began to develop febrile movement which was, in the after-light of the case, very evidently due to septic infection. As the wound had healed by first intention, and there was no tenderness or soreness in its neighborhood other than that which would be associated with a newly-healed wound, it was not believed that any local infection at the site of operation existed. Persistence of the fever, the absolute exclusion of malarial infection by the history and by microscopical examination of the blood caused the wound to be opened and investigated carefully to see whether any of the stitches had produced a small septic focus. This examination, however, was entirely negative in its results. Some days later, the fever still continuing, a still deeper incision in the neighborhood of the first one was made; thorough exploration to the peritoneum was carried out, and everything found in perfect health. Wasting, continued fever and some pain now developed in the right side, low down, and shortly after, acute septic peritonitis developed. An operation was attempted, it being recognized that a septic focus really existed deep down in the pelvis. The patient was too exhausted to permit of its completion and was put back to bed, dying a few days later with all the characteristic symptoms of septic peritonitis. The post-mortem revealed a large pyosalpinx which had produced secondary infection and a general septic peritonitis.

In connection with these cases of secondary infection, through vascular and lymphatic distributions in the abdominal cavity, one must not overlook an interesting observation made by Körte, that by penetrating the wall of the appendix at the point of mesenteric attachment, even at some distance from the base of the organ, it is possible to form an extravasation outside of the peritoneum, spreading backward to the root of the mesentery. This may explain in part the occasion of monolocular or single abscess in the retroperitoneal cellular tissue. These abscesses may also arise, as is well known, around the kidney and the liver, and even perforate the diaphragm and produce abscess in the mediastinum or lung. Phlebitis often may arise in the mesenteric vein or in the veins more closely connected with the appendix, namely, the ileocolic vessels, and Curtis states that an extraperitoneal abscess may extend upward toward the liver and then first perforate into the general peritoneal cavity, giving the deceptive appearance of peritonitis beginning in the upper part of the cavity. This abscess may even proceed further, go up behind the liver or beneath the diaphragm and finally break into the lung where it may be expectorated, give rise to a belief that there

is an empyema which has ruptured into a bronchus. In other instances a diagnosis of a sub-diaphragmatic abscess is made without the primary diagnosis of appendicitis being thought of. Frequently cases are seen in which the appendix is the cause of the illness and yet as Munro states the symptoms are found elsewhere. On the other hand it is noteworthy that large quantities of pus may accumulate, burrow upward and still not cause infection. Some cases of colon infection are due to the appendix discharging pus into the bowel.

Reference was also made by Dr. Hare to the class of cases of infection of the large bowel resulting from appendicular disease. Here he said there was a constant oozing of pus from the appendix into the head of the colon. He was convinced that such cases are seen quite frequently by the physician and the cause entirely overlooked. The first case of this kind which he had seen was that of a young girl who had had chronic diarrhoea without evidence of appendicitis for some months. Finally she had an acute attack of appendicitis, and at operation it was found that the colon had been poisoned with septic material from the appendicular disease. Since that time, Dr. Hare had seen a number of other such cases. One under his care at the present time, and recently operated on, was that of a young man who for three or four years had been in ill health. When he came to Dr. Hare's office the patient had the appearance of being broken down in health. He had been treated for gastric ulcer and for dilatation of the stomach, and had been taught to wash out his stomach night and morning. Very careful palpation aided by slight exacerbation of localized symptoms in the neighborhood of the appendix called attention to a hard cord-like mass under the fingers. The appendix which was taken out was as if made of erectile tissue. Pus could be squeezed out by gentle pressure. Within ten days there was relief of nearly all the abdominal symptoms.

As Dr. Munro had emphasized other points Dr. Hare expressed his wish to emphasize this class of cases as forcibly as he could. Dr. Hare thought the paper of Dr. Munro of peculiar value, as illustrating the occurrence of infection by means of the abdominal lymphatics, to which Dr. Hare did not think sufficient attention was paid in the study of abdominal conditions. He had no doubt but that a large amount of trouble in the neighborhood of the diaphragm is transmitted infection which has arisen in the neighborhood of the groin or the pelvis and in which it might be necessary to operate.

The paper of Dr. Munro is of value if for no other reason than that it emphasizes facts somewhat known but heretofore not sufficiently sought for. Speaking from an experience limited when compared to that of one's surgical friends it seems that Dr. Munro has had an experience peculiar in the frequency of these complications.

DR. JOHN B. ROBERTS said that he thought the paper of interest because it brought to mind much more prominently than is done ordinarily the secondary results of appendicitis. His opinion was that physicians as well as surgeons are inclined to look upon the condition as more local than it

really is. He thought that papers of this sort with such an array of clinical evidence offered in such a systematic and scientific manner would bring to the mind of all very many cases which had not been studied with sufficient care or which would have been better understood had they been looked at with the light given by Dr. Munro's paper. He thought the medical profession was inclined to look upon the appendix as being a sort of surgical portion of the body and that this paper would show the danger of treating only the inflammation of the appendix. He remarked that all had seen the retroperitoneal infection which Dr. Munro had mentioned, where the abscess has travelled up and down and in all directions, giving rise to various symptoms, sometimes understood, sometimes never understood until the death of the patient. He recalled one particular case in which he and one or two others had operated on a man three or four times for sinuses in the back, attributed to disease of the spinal column. After a period of perhaps a year or eighteen months, in examination he thought he felt an enlarged appendix. This was cut down upon and there was removed an old withered-up sort of appendix which had been adherent for a good while. Although there could be found no direct connection with the sinuses in the back he thought that there was originally a tract which had given rise to abscess due to one of these infections throughout the lymph circulation.

Septic abscesses of the liver due to phlebitis he thought had been well recognized, but hardly in such a definite way as had been brought out in the paper. He thought all surgeons would agree with Dr. Munro that thrusting needles through the skin into the liver was a thing at the present time hardly looked upon as good surgery. Operation by incision in the anterior portion of the abdomen, so that the liver could be palpated and the various portions inspected and the abscess drained, he thought a much more surgical procedure.

The essence of the paper in Dr. Roberts' opinion was an array of facts which one individual had made to show that lymphatic infection if looked for is quite common. It is only another instance of what is so often seen, that the man who does not look, does not see, and that when one's mind is directed to one particular affection one sees that these affections have been under his eyes for years and under the eyes of his confrères, but have not been fully appreciated.

DR. EDWARD MARTIN said that he thought Dr. Munro's paper would cause the Society to look back with somewhat different vision, and perhaps the first tendency would be to regard nearly all the abscesses considered as postperitoneal, and especially those without detection of their nature, as due to appendicitis. Yet, he believed that would be a step in the wrong direction. He thought possibly Dr. Munro's experience was the outcome, not so much of the frequency of the condition as of a peculiarly large experience in a certain class of cases. He thought the cases of postperitoneal infection were rare, and that a general statement of all appendicitis being accompanied by postperitoneal infection not in consonance with ordinary surgical knowledge. Lymphatic infections he thought might be present, but if they

were only determinable by microscopical examinations they were in a measure unimportant surgically. The surgical determination of their presence depended on their being of sufficient virulence and intensity to give rise to macroscopical changes. A wound which was freely suppurating would not be likely to cause lymphatic infection, provided the drainage was free. The same general rule he thought would apply to the postperitoneal glands; certainly it applied to late infections. The existence of that general surgical fact Dr. Munro had shown by the cases he reported. That all cases of appendicitis were accompanied by a postperitoneal infection which could be ranked of surgical importance, did not seem in his opinion to be in consonance with the surgical knowledge of infections in other regions of the body. The general lesson which Dr. Munro's paper taught, Dr. Martin thought, was prompt diagnosis and early operation.

Infections of the liver, at least in the experience of the majority, he thought comparatively rare. The prognosis has seemed mostly unfavorable, the main reason for which was not so much the difficulty of making a possible or even probable diagnosis, as it had been the impossibility of getting at the usual foci of pus.

The exploratory needle had been condemned by Dr. Munro and Dr. Roberts as antique and out of date in exploration of the liver. Yet, there may be no indications on palpation or inspection as to any particular point in which an incision can be made, and there are comparatively few who would deliberately and at random incise the liver, and make an opening of sufficient size to introduce the finger. The last time he had seen this done the patient was lifeless within two minutes. A large vessel had been struck and the patient bled to death very promptly. In the absence of external guides, therefore, it might under some circumstances be desirable and much safer to have recourse to the older and much safer method.

The prognosis in these cases must always be inclined toward the unfavorable side. He thought all could look back with a feeling that if there had been as clear a comprehension of these infections as Dr. Munro had given they would in certain cases have done differently, but the fact remained that both forms were the exception and not the rule.

DR. JOHN G. CLARK said that he was especially interested in Dr. Munro's paper from the lymphatic stand-point. In the consideration of the lymph circulation, that of the general peritoneal cavity, which is only a great dilated lymph space, should definitely be taken into account in these cases, if portal and perirenal infections follow appendicitis. During the last year Dr. Clark has been conducting with the assistance of Dr. Norris a series of experiments on the same plan as that of the Italian investigator Muscatello, who has demonstrated the almost incredible rapidity of the elimination of small granular bodies from the peritoneal cavity.

In repeating these experiments Dr. Clark has found that carmine granules injected into the peritoneal cavity of animals in the sitting or upright posture may be found within five hours in such remote parts as the bone-marrow of the femoral bones. The route of distribution is through the central ten-

don of the diaphragm, the retrosternal lymphatics, thence cuts the venous circulation and into the right heart. From this central distributing point the granules are deposited in the various organs in proportion to the blood supply. First the lungs, next the liver and coeliac circulation, then the kidneys, and, finally, the general lymphatic glands of the lower extremities. When the granules are small, many are swept directly through the lungs, and as the hepatic is the next large circulatory system en route myriads of granules are deposited in the liver, and naturally according to the volume of circulation in a decreasing ratio in the other organs more remote from the heart. As to the practical application of these experiments to such post-operative complications or sequelæ to appendicitis as reported by Dr. Munro, Dr. Clark maintains that the peritoneal lymph route must necessarily be taken definitely into consideration in these cases.

Given an infection of the peritoneum one of two things may happen, either a general or local peritonitis is produced or the peritoneum resists the infection and it is swept into the general circulation through the diaphragm. The lungs being a sieve which prevents the bacteria from passing through, the liver and kidneys are the next large organs en route and are more likely to become infected, hence it appears justifiable to look upon some of these post-operative complications as possibly due to this method of infection. Certainly when the appendix is dependent and lies free in the peritoneal cavity would this be more likely to occur. If, on the contrary, the appendix is buried beneath the cæcum, or is walled in by adhesions, the routes of infection described by Dr. Munro would be the most probable ones.

DR. SIMON FLEXNER said that he had little to add to the admirable discussion of appendicitis to which he had just listened. He was greatly interested in the facts brought forward by Dr. Munro concerning the importance of lymphatic and vascular infections in the course of the disease. He thought, moreover, the paper extremely timely as bringing out the growing belief among pathologists that thrombosis is more frequently, than formerly believed, bacterial in origin. The studies of thrombosis occurring in the course of infectious fevers, as well as those designated marantic, tend to show that autochthonous thrombosis is relatively of rare occurrence, and that bacteria can often be found in the walls of the veins and the original thrombus in these conditions. He also agreed with Dr. Munro in ascribing the extension of infections through the lymphatics and veins directly into adjacent parts. On the other hand, he thought that Dr. Clark was supported in his views by his observations of the ease and rapidity with which bacteria are distributed through the body by local processes. He recalled the observations of Fütterer, of Chicago, who discovered that bacteria introduced into the circulation, begin to be eliminated in a surprisingly short time, and might be found in the bile, etc., at the end of a brief period. The liver, spleen, and bone-marrow being favorable sites for the deposition of bacteria, these organs might be considered as carrying out an active process of bacteria destruction. He thought, that in the strict sense of the term,

local infections were much rarer than generally believed on account of the readiness with which bacteria, in some numbers, penetrate into the general circulation. From these considerations he thought that the practical inference was that it was good policy to eliminate the source of these infections.

DR. GEORGE ERETY SHOEMAKER thought the paper a very interesting one. An important point is that the vein infection is here worse than lymphatic infection and they should not be confused in the mind clinically. The veins here belonging to the portal system and consequently an infected blood stream goes to the liver. Infection of the veins of the liver, the so-called pyelophlebitis has long been known to be almost always fatal. Lymphatic infection here as elsewhere in the body may be localized and form a relatively less dangerous abscess which can be surgically drained. The reason more of such cases were not seen he stated to be because patients usually die of general septic peritonitis and not of the posterior infection, the route to the peritoneum probably being easier. In looking up the material some years ago when writing a paper on this subject (*Medical News*, April, 1893) it was shown that the condition was quite rare, few men having had more than one or two cases. He said Dr. Munro had had an unusual experience and that it is almost useless to operate in these cases of liver infection because the abscesses were multiple and because they were so deeply seated as to be, in most instances, out of reach. In two cases reported by him which had come to post-mortem the liver abscesses while extremely numerous were not usually larger than a pea. In one of these the veins behind the peritoneum could be seen filled with grayish fluid and their inner walls were gray. In some of the cases reported by Dr. Munro only one abscess was drained yet others ultimately caused death. This Dr. Shoemaker attributed to the anatomical character of the venous route of infection. He said the infection was probably not from the general peritoneal cavity. In two autopsies which he had seen the peritoneal cavity was free from infection, although the chain of veins could be picked up as distinct post-peritoneal thickening. As to the diagnosis, writers agree that frequent and continued and severe chills, tenderness of the liver, enlargement of the spleen and jaundice are important. Jaundice was not ordinarily a sign of liver abscess but was of multiple abscess from vein infection. He thought it important to remember that the early symptoms of appendicitis are later lost in these cases, being obscured by the subsequent liver symptoms. If the case has originally given a clear history of appendicitis no later developments must be allowed to confuse the mind. He thought it was the recognition of the early symptoms which offered hope. Early operation on the appendix would forestall pyelophlebitis and so make recovery possible.

DR. M. HOWARD FUSSELL said Dr. Munro's paper would make the members remember many cases that they would have looked upon as perhaps instances of either lymphatic or portal infection if they had had the experience of the writer of the paper. He recalled a case under his notice some years ago in which a physician, thirty years of age, was seized with pain in the appen-

diceal region. It was decided that he did not have appendicitis. Two or three weeks after the beginning of the first symptoms, during which time he had severe chills and fever, he developed jaundice. He was operated on for appendicitis and the appendix was found to be the size of a thumb, and filled with pus. The appendix was removed, and at the same operation it was found he was suffering from multiple abscess of the liver. He thought that the prognosis in these multiple liver abscesses must be grave because of the multiplicity of the abscesses. As Dr. Martin thought, he believed too that there are some appendices which should remain in the body. Dr. Hare had said that epigastric pains were often caused by appendiceal disturbance; on the other hand, it must be remembered that many epigastric pains were not due to appendiceal disturbance. He had under treatment a case in which the patient had suffered severely from epigastric pain, from nausea and all the disturbances dependent upon gastric trouble. He fell into the hands of an enthusiast upon removing the appendix. The organ was removed two years ago. The man had never been a particle relieved, and to-day has very serious gastropnoia which in all probability is the cause of the symptoms.

DR. MORDECAI PRICE disagreed with Dr. Munro in some things, and said all the trouble from appendicitis cases was due to the mistakes of the attending physician, and the cowardice of the surgeon. His conviction came from a large experience with appendicitis associated with well established abscesses of many feet of the lymph tract and of the peritoneal cavity. The simple opening of an abscess when coexistent with appendicitis was not an operation, the mortality of such a procedure must of necessity be high. He believed that the lymphatics are the surgeon's friends in that they stop the infection by blocking the way. He believed in the thorough irrigation of the peritoneal cavity, with the complete rupture of all adhesions, delivery of the head of the colon, and the removal of the appendix complete for the relief of all infection outside of the lymphatic system. It had been his experience in over 100 cases of this kind, that the patients got well if they drained at all. He had never seen but three cases that would not drain. He believed that all these abscesses were inside the peritoneal cavity. It is his custom after operating for suppurating or gangrenous appendicitis, if the temperature is above 101° to remove every particle of drainage and reapply it. If the temperature does not return to 101° or less he again removes the packing and examines the wound. In a number of cases the relief had been instantaneous.

DR. MUNRO in closing the discussion said that he felt very much honored by the very wide consideration given the subject.

He stated that the young girl whose case was cited, certainly, had both lymphatic and portal infection following well-marked appendicitis, and that since operation, there had been no return.

He expressed his appreciation of the emphasis given by Dr. Roberts to the danger of medical treatment exclusively in appendicitis.

In reply to Dr. Martin's expressed belief that all these cases of retroperi-

toneal inflammations were not due to appendicitis, he thought that was true, but he did not believe that Dr. Martin could disagree that a certain proportion of infections in the loin may come from appendicular inflammation. He had seen one case in about 100 in which the liver was affected. Within the last four months he had had two cases, both beautiful illustrations of these infections. One was a man who had evidence of beginning lymphatic infection, from which he recovered. The other was a little fellow, with a subacute attack, who on the third or fourth day was operated upon for appendicitis. The appendix was found twisted upon itself, without pus or adhesions. The mesentery was becoming gangrenous. It was a perfectly simple, definite operation, in which the appendix was ligated close to the cæcum and the wound drained. The temperature did not come down after operation and the general condition was not as good as it ought to be. There was something about the appearance of the patient which was not satisfactory. On the third day slight mental dulness was noticed and the boy became jaundiced. There was œdema in the right hypochondrium with severe chills, and rise of temperature. The wound all the time was clean and dry. After four or five days the temperature fell to normal, but then the jaundice increased, and although there was a normal temperature temporarily, this was but the calm before the storm, the case becoming steadily more and more septic.

The liver may be opened with the ordinary directors instead of being aspirated. Usually palpation of the liver will serve as a guide. It is not possible to say that one can always drain these liver abscesses; in some of them the abscesses are right on the surface; in others the abscess is far below the surface. The trocar is too narrow and the pus will not freely run through it.

He expressed great pleasure in having seen the specimens to which Dr. Clark referred, and felt that he should return to Boston with much new information. His understanding of Dr. Clark's experiments was that the absorption of carmine was most rapid through the diaphragm and thence downward through the hilus of the kidney. The postcæcal type of infection mentioned by Dr. Clark, Dr. Munro ruled out entirely in the paper.

Replying to Dr. Shoemaker that it was useless to operate, his conviction was that it is useless to let the condition alone. He believed that the only hope was to drain the abscesses. Such cases die, he said, if they get beyond a certain stage, but a small proportion he thought would live after drainage, the operation not being so severe as it would seem. Even if all the abscesses were not tapped, an exit was made into which they would tend to drain. Jaundice is not always present in these cases following appendicitis.

He agreed with Dr. Fussell that the prognosis is always grave, and believed that when pus is confined there is no reason why it should not be let out if possible.

He agreed with Dr. Price that an early diagnosis was exceedingly important, in appendicitis or in any other condition. The one thing he

desired in his paper was to help men to make early diagnoses. The glands, of course, were blocks of infection, as stated by Dr. Price, but he believed that in a certain proportion of cases these glands would break down into pus, which it is necessary to drain. The breaking up of adhesions he thought brought up an entirely different question, and upon that point he did not agree at all with Dr. Price. He could not treat appendicitis as Dr. Price did, and he did not believe the results in Boston compared badly with those elsewhere. He agreed with Dr. Price that after operation and proper drainage with a temperature of 101° there is infection somewhere, but he did not ordinarily look for it in the wound itself, but sought the trouble elsewhere, it not being necessary in his opinion to "rip and tear" everything all out again. Infection in many of these cases he believed was behind the peritoneum, and not within it.

Report of a Case of Enormous Ventral Hernia; of a Case of Dermoid Cyst of the Ovary; and of a Case of Profound Shock following a Crush of the Arm.

BY FRANCIS T. STEWART, M.D.

[Read December 26, 1900.]

I am indebted to Dr. Morton for the privilege of operating upon and reporting the following cases :

CASE I. ENORMOUS VENTRAL HERNIA.

A. C., aged forty years, was subjected to abdominal section four years ago for pelvic trouble, the nature of which is unascertainable. She remained in the hospital one year and was kept supine for several months. A small hernia was noticed two months after operation; this rapidly increased in size as she began to walk about. The patient is thin but apparently strong. The bowels are always sluggish and often obstinately constipated. There are no evidences of any interference with the other abdominal organs. The heart, lungs, and urine are normal. When standing, a large, soft, tympanitic tumor projects from the abdomen and hangs down below the pubes. When lying down about half the protuberance disappears, and after persistent efforts of reduction a mass the size of two fists still remains. The ring formed by the separation of the recti extends vertically for seven inches, and laterally four inches. Two surgeons had seen the case and refused to operate.

She entered the Pennsylvania Hospital December 19, 1899, was put in bed and given mild aperients for ten days without any material diminution of the hernia. Under ether an incision was made from

just below the ensiform process down nearly to the pubes, the thickened sac was immediately encountered and opened; it contained the lower half of the stomach, all of the transverse colon, and most of the small intestines including omentum and mesentery. Adhesions were numerous and dense. Owing to the diminished space within the peritoneal cavity almost all the omentum was ligated and excised with the sac. The intestines, "having sacrificed their right of domicile in the abdomen," were most difficult to replace; they were attacked with the Trendelenburg posture, a great deal of force, a large amount of coaxing, and were finally induced to return to the abdominal cavity. The peritoneum was closed by a continuous catgut suture; each rectus was loosened from its sheath, slid inwards, and united to its fellow by heavy chromicized catgut, I should use silver wire in a future case; and the skin, a large portion of which was resected, was sutured with silkworm-gut. Broad adhesive strips were applied to support and strengthen the belly wall. The operation consumed one and one-half hours. There was considerable shock and much vomiting. The respirations registered sixty to the minute, remained rapid for one week, and were out of all proportion to the pulse-rate. The patient was kept in bed one month. After two months there was no recurrence.

In most cases of very large herniæ operation is said to be unjustifiable because of the difficulty and often impossibility of accomplishing reduction, on account of the increased danger to life, and for the reason that it is usually fruitless, the rupture reappearing and rapidly attaining a large size. We attempted operation in the case under consideration because of the increasing intestinal interference and unmanageableness of the tumor, believing that we at least could make the opening small enough to be covered by a truss, and, finally, in order to gratify the enthusiasm of the patient who appreciated the peril, the uncertainty of cure, but who would hazard and welcome any procedure essayed to mitigate her distressing condition.

CASE II. DERMOID CYST OF THE OVARY.

A. B., aged thirty-three years, was admitted to the Pennsylvania Hospital January 29, 1900. She had had one child one and one-half years before. The menses had been absent six weeks, during which time she complained of pelvic pain and leucorrhœa. Bimanually, an adherent mass could be felt behind the uterus on the right side. A diagnosis of ectopic gestation was made. At the operation the mass proved to be an inflamed dermoid cyst of the ovary, containing fatty detritus, cholesterine, compound granular cells, pus cells, and

two perfectly formed but atypical teeth. The recovery was uneventful.

Formerly, cases of this character were regarded as imperfect ovarian pregnancies with or without sexual intercourse, the ovary was thought to be autogenetic, and the absence of menstruation which sometimes precedes the discovery of the cyst lends credence to this view, which still has its advocates. The phenomenon that the ovary alone is selected as the seat of dermoids in preference to all the other abdominal organs makes the inclusion theory equally difficult to comprehend.

CASE III. PROFOUND SHOCK FOLLOWING A CRUSH OF THE ARM.

N. T., male, aged twenty-three years, was brought to the Pennsylvania Hospital October 14, 1900, by the patrol wagon. He had been found lying under a freight train with a badly mutilated left arm. He was cold, unconscious, wet with rain, and covered with dirt and cinders. The pulse could scarcely be felt, the respirations were shallow, the pupils dilated, and the axillary temperature approximately 88° F., the thermometer would not register, its lowest mark being 90°. With heat and stimulants the temperature reached 100° during the course of ten hours. The arm was then amputated just below the shoulder-joint. It was remarked that the axillary vein contained a thrombus extending far above the point of ligation. The patient reacted from the operation and seemed to be doing very well when he suddenly and unexpectedly expired five hours after operation from, as we believe, a large embolus blocking the pulmonary artery. There was no autopsy.

DISCUSSION.

DR. WM. L. RODMAN said that he congratulated Dr. Stewart on the very gratifying result obtained in the first case; he agreed with him that the proper thing was done; and thought with him that possibly in such cases silver wire would be a better suture material than chromated gut.

The third case always raises the very interesting question, whether amputation shall be done during the existence of very profound shock. Dr. Rodman had a similar case only two nights before. He wished to operate during shock, but the patient and relatives declined amputation of a limb that had been severely "crushed" by a street car and the man has continued to grow worse and will undoubtedly die without reaction. These cases should be operated upon in shock as the presence of the mangled limb perpetuates shock. If one waits for reaction, it may be to await what will not occur.

DR. J. C. DA COSTA said the results in the hernia case merited congratulations. He himself had operated on a number of them, but on none so large as the one reported. In cases of very large herniæ, the better way to

close the incision is to split the muscle, turning part down, and part up, and so close it. He did not remember a failure in a case where he had operated on a large hernia in which he had used this method. The second case, that of the dermoid cyst, was very interesting. Dr. Da Costa had in the Museum of the College of Physicians a specimen that not only had hair and bones, but the whole roof of a mouth studded with pebble-shaped teeth such as is found in sheep's head fish. It is rare to find a dermoid with neither bones nor hair, and with nothing but teeth in it. The only evidences of a dermoid in a forty-pound cyst removed by Dr. Da Costa were two front teeth and the palate bones. Such specimens are unusual.

DR. FRANCIS T. STEWART said that Dr. Da Costa in his remarks had referred to placing the recti vertically when suturing them. The ring in the case operated upon by Dr. Stewart was so large and the protrusion so great, that it was impossible to adopt any such procedure, and it was scarcely possible to bring the recti together, even after they had been freed from their sheaths. Giccede, an Italian surgeon, advises placing one rectus directly over the other in closing umbilical and ventral herniæ, but such methods are out of the question in rings of great magnitude.

The Rational Treatment of Chronic Suppuration within the Antrum and Attic.

BY L. J. HAMMOND, M.D.

[Read December 26, 1900.]

The surgical treatment of this heretofore most obstinate condition seems now to have reached the point where it is almost universally conceded to be the proper treatment in all cases in which less radical methods, though judiciously employed, have failed to bring about the desired results. The process being a suppuration within a closed bony cavity, with, in most cases, inadequate drainage, it, consequently, is inaccessible to any form of treatment designed for cleansing purposes, and is therefore, obviously, a lesion to be dealt with surgically only. Indeed, in only so far as it is considered and treated in a surgical manner, can success be approached in its treatment.

The indications, as would be naturally inferred from the character of the cases, are to reach through as direct a route as possible, the antrum and attic, and remove all diseased tissue, both hard and soft (cholesteatomata, granulation tissue and carious ossicles). Of equally as great importance as access to, and removal of the débris within this bony cavity, is the establishment of a direct drainage route, which experience has taught is necessary in every case, as the tendency to heal-

ing of this once exenterated cavity, is not so great as that of its refilling with granulation tissue and cholesteatomata; the establishment of this drainage route is important as well for subsequent cleansing, as it enables the ready introduction of the nozzle of a syringe directly into the cavity, and the free use of sterile water, followed, if need be, by the direct application of caustics to the exuberant granulations, that not infrequently arise after operation; on the other hand, if there be a sluggish tendency to cicatrization of the cavity, gentle curettement can as readily be done.

All methods with which I am familiar, with possibly the exception of that advised by Kuester, are faulty, in that they make no provision for treatment of this bony cavity after closure of the posterior incision takes place, which as I have found in quite a few cases, occurs long before the bony cavity heals. Kuester's method itself, which differs from those of Stacke, Schwartze and Lucka, only in the further step of splitting the back wall of the membranous canal, has also the disadvantage of as early closing as the posterior incision; therefore by none of these methods can the antrum be treated directly, unless the long continued post-auricular route be maintained, which is undesirable as well as likely to leave considerable scarring if thus kept open.

With a desire to overcome some, at least, of the objections cited, I have made a slight modification of the method advised by Kuester, and have found it satisfactory. The modified operation consists of making an oval opening through the membranous canal, directly over and corresponding with the position of the opening in the back wall of the bony canal, the steps of the operation being as follows: After the bone is exposed and bleeding arrested, the periosteum having been lifted in one sheet, always avoiding, if possible, tearing it off in shreds, entrance is made to the antrum through an opening chiselled through the upper back wall of the canal, chiselling being kept above what would correspond with the middle of the tympanum. When the antrum is reached, the further work can be accomplished with the sharp fenestrated curette; the opening into it should be enlarged to sufficient size only, to permit of exploration with the probe, under perfect illumination secured by reflected light from the head mirror, with the object of determining to what extent the bony wall is diseased. If this is limited to the antrum and attic, no more healthy bony wall is removed than is necessary to introduce a curette or bone forceps, and remove the granulation tissue, cholesteatomata and diseased ossicles, all or at least some of which are always present. The back wall of the canal is then broken through, and a buttonhole opening made in the

membranous canal, to correspond both in size and position with the opening in the bony canal leading into the antrum. Immediately after the posterior incision is made and the auricle is turned forward, bichloride of mercury gauze is thoroughly packed around the edges, leaving exposed only the bony back wall; this prevents infection of the incised and contusion of the soft tissues, both of which are likely to occur during the cutting away of the bone and septic material from the bone cavity. After the cavity has been thoroughly irrigated with sterile water, it is snugly packed with one strip of gauze of sufficient length to permit not only the packing of the cavity, but of the terminal extremities of the gauze being brought out to the external meatus through the opening made in the membranous canal. When the gauze packing has been placed in position, the periosteum is brought together with cumol gut, and the remainder of the incision sutured subcutaneously with either silver or cumol gut, the former I much prefer. This method of suturing together with perfect toilet of the incised tissue, will in most cases secure primary union of the entire posterior incision. If desired, instead of the gauze, a small rubber drain may be inserted directly into the antrum; whatever drain is used, it should be removed daily, after the third day, and be reintroduced after the cavity has been syringed with hot sterile water.

While the treatment of the now exenterated antrum will be conducted with as great facility through the auditory canal, the advantages of having this opening directly from the canal and into it are obvious when it is recalled that in a large number of cases, suppuration recurs through openings that are inaccessible, while in those that can be reached, the openings usually are too indirect and small to permit of proper cleansing of this bony cavity. We have also the additional advantage in being enabled to learn whether the cavity becomes cicatrized, therefore thoroughly healed, or as is frequently the case, whether it becomes choked with granulation tissue, thus indefinitely prolonging suppuration, the masses of granulation tissue within the antrum causing after operation, failure of suppuration to cease. In my own practice, the percentage of continued suppurations after operation, was very large before resorting to the method of treating the antrum directly through the membranous canal; by this method, I have yet to record one failure, though in some cases, those of longest duration, the bony cavity has not healed for six months, the greater number, however, yielding in from nine to twelve weeks.

Altogether, this method of treatment has been so entirely satisfactory, that I no longer look upon this department of my surgical work

with the same dread as formerly, when treatment was made through the post-auricular incision. I was then always anxious to have the incision closed as early as possible, and there was the certainty of having concealed beneath it, the antrum cavity filled with granulation tissue, that found exit for its suppuration through a small opening in the upper tympanic cavity.

DISCUSSION.

DR. B. A. RANDALL said that he cordially agreed with the main points so well brought forward by Dr. Hammond, although in some details their opinions differed. He laid stress upon one or two preliminary points which he said appear to be insufficiently clear in the minds of many of the special and general surgeons who deal with these cases.

The opening of the mastoid for acute abscess is one thing, while those operations done for mastoid caries, in itself acute but a consequence of chronic tympanic suppuration, is another; and the group of cases to which Dr. Hammond referred—the suppurations of the tympanum, inveterate and unhealed by other methods, but without known mastoid involvement—constitutes a third. The first calls for opening of the antrum-cavity to a good evacuation and drainage. Sometimes we can get primary, and generally early union of the posterior wound, usually keeping it open until healed from the bottom. The second class of cases, in which there is acute mastoid involvement with a chronic middle-ear suppuration, calls not only for thorough mastoid opening but also for the operation described by Dr. Hammond as the completion of the procedure, an exenteration of the mastoid and tympanum. When this is not done thoroughly, imperfect results are generally obtained. Then, in chronic middle-ear suppurations with no known involvement of the mastoid, there is, as has been described by Dr. Hammond, a condition which has been very unsatisfactory, unless radically dealt with by tympanic exenteration. This cleaning out and opening up of the antrum, attic and drum-cavity proper, to free future access is the procedure which is under consideration. Disagreement was expressed with the degree of credit given Professor Kuester in relation to the operation because there is little which he has brought forward, however much he claimed for himself, that had not been done, already, by Stacke and other aurists, whose work he ignorantly condemned. There are better methods than Kuester's, for he chisels away the entire back wall of the canal from the surface of the mastoid inward, and claims, as satisfactory, results, which would satisfy few aurists. An operation which is needlessly extensive, which too often sacrifices hearing that ought to have been saved and is, withal, less generally complete in its cure than one has a right to demand, does not commend itself for adoption. (Illustrating diagrammatically on the blackboard.) If this be the mastoid process and this the auditory canal, Kuester would start at this spina suprameatum, after the incision of the soft parts laying bare the

bone, and chisel out most of the back and upper wall of the canal, throwing the tympanic and mastoid cavities into one with the canal—a very good procedure in such conditions as require it, and this method was employed by many before Kuester was heard of. But, the essential point, for the cases under discussion, lies in chiselling away what is needful of the upper-back wall of the canal to give free access to the antrum and attic, as can be done without interfering with the surface of the mastoid. This is the so-called Stacke operation.

As to the treatment after the caries has been dealt with, the splitting of the canal was done by Stacke before Kuester. The soft tissues with the auricle are turned forward to bare the bone for free attack, and if simply split, as Stacke did it, they furnish two small flaps, which he turned into the bone cavity. Instead of simply cutting out the tissues, as done by Dr. Hammond, following Schwartz, he made a T-incision so as to utilize these tissues as flaps to begin the covering with all speed of the bony walls of the cavity. Dr. Randall has modified this because the cartilaginous tissue in these flaps is detrimental to healing and it is better to exsect it, as it will shrink and sometimes become necrotic causing septic infection. It is not easy, but it is feasible, if one has neatly turned out the soft tissues, to dissect the periosteal layer free and turn up as a flap as much of the back wall as one wishes to open; the cartilage is thus laid bare and it can be exsected; and then one cuts through and shapes the cutaneous layer as another flap—obtaining twice as much flap to cover in the bone and this flap of thin tissue is more likely to prove effective. When these flaps have been turned into the bone cavity and lightly tamponed into place by gauze strips packed in through the normal meatus, the posterior wound can be closed as described by Dr. Hammond. Primary union is usual and the flaps have generally taken hold at the first dressing three to five days later; and whether they live or die, the full cavity is henceforth freely accessible through the canal, unless the later granulations are allowed to grow unduly so as to narrow or close the communication. Against this the flaps are a safeguard in so far as they succeed and they can be supplemented by Thiersch grafts.

DR. J. B. TURNER said that with Dr. Hammond, he had seen some of the cases described, but it was only within a few years that he appreciated that these cases could be handled with such safety. A leukæmic child who had suffered for some years with a running and malodorous ear, recovered perfectly under operation. Dr. Turner was assisted by Dr. Hammond in a few of these cases. The operation now described by Dr. Hammond had not yet been tried by Dr. Turner. The operation they usually performed was Stacke's; it included a posterior opening, and the auricle healed in a couple of weeks and was then treated through the meatus. The results were perfectly satisfactory. There is a class of cases that should be looked into by physicians and sent to the aurist for they generally seem to be incurable by ordinary treatment. Every one will not submit to this operation, but it is safe and should be recommended.

DR. HAMMOND said he referred to the Kuester method only in so far as

it pertained to the slitting of the back wall, the other steps of the operation were entirely different, nor had superiority been claimed for Kuester in the matter, history, however, as recorded by Allen, credits him with having been the first, or at least among the first, to deal with this cavity in a surgical manner.

The method described by Dr. Randall was well thought of by Dr. Hammond, because of the many excellent results secured through it by Dr. Randall, and Dr. Hammond himself had secured good results by it in some cases. Dr. Hammond's objection to it, at least in his own experience, existed because of frequent disappointment in securing union of the grafts reflected from the tissues into the cavity, and also on account of delay in cicatrization of the antrum and attic; it being possible to render this cavity sterile, sloughing of the delicate tissues being the most natural result to be looked for. As a result of this sloughing, a curling of the edges of this reflected tissue occurs, and permits of sagging of the back wall; even after union of the incised portion has taken place, there will be noticeable thickening, as well as a pent-up granulation mass within the antrum cavity. There is also a total failure to secure a bony lining in a goodly number of cases. Therefore, the best results are to be secured by allowing the cavity to take care of itself, and to secure a direct means of knowing that it does so.

Scurvy, not Rheumatism: Report of Sixteen Cases of Infantile Scurvy.

By J. P. CROZER GRIFFITH, M.D.

[Read December 26, 1900.]

Of all the diseases of infancy, that denominated "infantile scurvy" is, in most instances, one of the easiest to recognize as it is to treat. In a few, however, it offers considerable difficulties, and in some it seems to be one of the stumbling-blocks of physicians who have seen either little or nothing of the affection. This is generally because the symptoms simulate, at first, other disorders, particularly rheumatism. On this account it may be of value to detail the following sixteen cases, all of them seen within little more than eighteen months, and nine within six months before the date of writing this report. Most of them illustrate the likeness to which the title of the paper refers and the mistakes which have arisen. In a few the diagnosis offered no difficulties.

CASE I. A lady from Wilmington was one day telling me of the serious attack of rheumatism her little grandchild was experiencing under the care of a homœopathic physician of that city. The little girl had for weeks been suffering severe pain, especially in her legs,

and had not improved in spite of treatment. I felt free to say in response to her anxious questions, "Mrs. —, I cannot tell you positively what your grandchild has, but I feel practically sure it is *not* rheumatism."

On June 1, 1899, the child was brought to me, and the following history given :

Marion B., eighteen months old. Though delicate originally, she had been in good health for months. The feeding had been varied : Malted milk for the first few weeks of life, then Reed & Carnrick's food, next Robinson's barley, and finally Imperial Granum. The latter had been commenced in September, 1898, and continued for the nine months preceding the time of examination. It was boiled in water and then mixed with milk, which had been scalded only, no prolonged heating being used. In the last part of March, 1899, the child, then sixteen months old, developed pain in lifting the right arm. This soon disappeared, but returned. Next her legs grew painful. Early in May the gums of the incisor teeth, especially of the lower jaw, became swollen and red and bled easily. A change in diet at last was ordered by the physician, who now probably suspected that his earlier diagnosis of rheumatism had been incorrect. She was already somewhat better when I saw her. A necessarily hasty examination showed the child very pale, and with the gums slightly affected. The treatment ordered consisted of orange juice, raw milk, beef juice, the withdrawal of Imperial Granum, and, later on, the giving of eggs, oatmeal, and a more extended diet. Improvement was very rapid.

One must remain in doubt here regarding the cause of the disease. It is possible that the too early and free use of cereal food may have had some influence, though I am by no means sure of it. Perhaps the child had required a more varied diet.

CASE II. Mr. C., of one of the neighboring towns of New Jersey, asked me to visit his child, which I had treated about six months before. He stated that the baby cried nearly all the time, night and day, and that it appeared to have rheumatism in its legs. The physician in attendance had been unable to reach a positive diagnosis, but inclined to rheumatism, and had treated for this.

The child was seen on April 10, 1899. Its history and appearance were as follows :

James C., fourteen months old. He had been plump and hearty, and never ill, except for a curious convulsive condition when about seven months old. He had been fed on malted milk, except for a very brief interval, until November, 1898, when Just's food with ster-

ilized milk was substituted. About February 1, the gums became sore, and about three weeks later both knees became swollen. The child lost strength and weight, and often cried as though in pain. Finally, he cried most of the time and grew unable to straighten his legs. There had been some bleeding of the gums.

Examination showed a pale but well-nourished baby. While sitting he kept the legs fixed and hanging downwards as though paralyzed, giving much the appearance of the paralysis of a poliomyelitis. There was some tenderness of the knees and a distinct enlargement of the right tibia. The gums of the incisor teeth were red and swollen. The head was slightly rachitic and a rickety rosary was present. The diagnosis of scurvy was clear.

I ordered the administration of orange juice and beef juice, the withdrawal of Just's food, and the use of raw milk. Improvement was immediate. The constant crying stopped almost at once, and in a very few days all pain, pseudoparalysis and redness of the gums had vanished.

Here, again, it appears that a dietetic error was certainly the cause of the disease, but the exact nature of this is uncertain. The simulation of rheumatism on the one hand and of paralysis on the other was very striking.

CASE III. "Doctor," said Dr. —, as I met him at a suburban railroad station, "I have a puzzling case I want you to see. The child appears to have rheumatism, but I wanted to ask you whether this is not a very uncommon disease in infancy."

I replied that it certainly was so in my experience. Making a mental snap diagnosis I presently asked: "How are the child's gums?" Hearing that they had been very much inflamed, the diagnosis of scurvy now became very probable.

At the house the following clinical history and results of examination were obtained:

Rosemary MacN., one year old, seen May 6, 1899. She had suffered from malnutrition in the early months of life, but later became plump and hearty. She had been fed on Mellin's food and sterilized milk. About six weeks previously the left knee became painful, and then the right. Very soon the middle of the right thigh grew thicker and was painful when touched. Only for the last two weeks had the gums been swollen and purplish. Quite recently there had been some pain in one arm. Antirheumatic treatment had been given without effect.

Examination showed the right thigh swollen and hard. There was no involvement of the joints. The knees were flexed most of the time.

The child let its legs hang as though they were paralyzed. The gums of the upper incisors were swollen and deeply purple-red.

I gave it as my opinion that the baby had scurvy, with which the attending physician entirely concurred, saying that he felt as though "scales had fallen" from his eyes.

The child was ordered raw milk, Mellin's food was withdrawn, and orange juice prescribed. Pain disappeared and health was regained with very great rapidity.

Dietetic error was clearly the cause in this case also. Whether this was due to the use of Mellin's food or to the sterilization of the milk cannot be definitely determined.

The following case of scurvy, occurring in Germantown, is of interest only from an etiological point of view. Dr. Th. C. Potter, with whom I saw it, had already made the diagnosis.

CASE IV. Roland F., nine months old, seen February 19, 1900. The child had been healthy and well nourished. He had been fed on Mellin's food, with which had been mixed milk and water, which was heated but not quite to boiling. About four weeks before seen by me he developed fever and great pain when his right leg was moved. No swelling could be found at that time. This condition continued about thirty-six hours, and afterward appeared intermittently, lasting a couple of days at a time. Finally it developed more persistently, accompanied also by œdema, and last by involvement of the gums.

Examination showed the right leg and thigh œdematous and somewhat painful on passive movement. It could not be determined whether the tibia was thickened or only the soft tissues affected. The gums of the upper incisors were quite swollen and purplish.

The child was put upon orange juice, Mellin's food was withdrawn, and the milk not heated above body heat. Recovery was very rapid.

In this case we can at least exclude any deleterious action of prolonged high temperature upon the milk, since this was at no time employed.

The intermittent nature of the pain as often seen in this disease is also well exemplified.

CASE V. The next case is one of peculiar interest from the fact that it was brought to the surgical out-patient department of the Children's Hospital on account of pain in one hip, which rendered the diagnosis of hip-joint disease probable. Dr. Jopson carefully examined it there for the existence of coxalgia, and decided to apply an immobilizing dressing as a preventive measure. This was worn for some days, the child meanwhile visiting the dispensary once or twice. Finally, at its visit on May 19, 1899, the other hip was also found to be painful.

Dr. Jopson then decided that the affection was scorbutic, and referred the case to the medical department, where the following history and examination were obtained.

George T., thirteen months old. He had been fed on condensed milk for the first four months of life; next on Mellin's food until eight months old; and since then on malted milk. He thrived indifferently well, but for five months sweating had been profuse. He had been very fretful recently.

Examination showed the child plump and of good color, with no osseous symptoms of rickets, except slight beading of the ribs. Movement at both hip-joints and both knees was very painful. There was no affection of the gums. A slight petechial eruption was present over the dorsum of the feet.

The diagnosis of scurvy seemed very certain. The baby was ordered orange juice, beef juice, and a mixture of milk and water which was to be scalded. In a very few days he had evidently much less pain, and could move the legs more freely. The eruption was disappearing. In a few days more the symptoms of scurvy had entirely vanished.

It is clear that sterilized milk was not an etiological factor in this case, since no milk was added to the Horlick's food. In fact, the use of scalded milk was one of the therapeutic means employed in the treatment of the disease.

CASE VI. The next case was a child of a physician and had been under my care. I can offer no excuse for a failure to make the diagnosis earlier than I did.

Joseph C. A., born March 28, 1898. He had been a healthy, well-nourished child, and had been thriving for months on a sterilized mixture of cream, milk, and water, with dry malt extract. When seven months old he was exposed considerably on a river trip, and, a few days later, just before the end of October, he became cross and fretful, and lost his appetite to some extent. For the last three days he would cry out suddenly while in the arms, as though afraid or in pain. The pain seemed to be situated chiefly in the legs.

Examination by me on October 31, 1898, showed a large, fat child, with slight beading of the ribs. Forcible extension of the right leg made the child start and cry. No swelling or redness could be discovered anywhere. There was no affection of the gums. The two lower incisor teeth had been cut.

The history of exposure made me underestimate the possibility of scurvy, and I made a provisional diagnosis of rheumatism of the right knee, and asked the father to report in a few days.

The report did not reach me, however, until nearly a month later (March 23d). The child had continued fretful and with pain in the right leg. For a few days he had had pain in the other leg also, and had seemed unwilling to move either of them. Passive motion of them often gave pain. There was some sweating of the head. About a week ago the upper gums in front looked like a "blood blister," but this had improved.

I at once made the diagnosis of scurvy, and visited the child the next day. Examination then showed the gums of the upper incisors swollen and a little red; no discoverable swelling of the tibiae, some beading of the ribs.

I ordered orange juice, the withdrawal of malt extract, and the stopping of all cooking. In two days the pain was nearly well, and in five days more entirely gone.

It is impossible to be sure in this case whether the scurvy was due to the addition of malt extract or to the sterilizing of the milk, or to some other cause. I was unwilling to make a therapeutic test to determine this.

CASE VII. The following case was interesting on account of the long continuance of the attack, about six months in all, and of the difficulty in diagnosis which it presented. The attributing of pain to a trauma is worthy of note.

The case occurred in the family of a prominent resident of Easton. The father called upon me on June 14, 1899, to talk over the condition of his child, the nature of whose ailment had not, he said, seemed clear to several physicians who had been in attendance at different times. One insisted that the child must have had a fall, while others suggested the possibility of rheumatism. From the father's description of the symptoms, I felt it extremely likely that the case was one of scurvy. Two days later I saw the child and obtained the following history and examination:

E. D. W., sixteen months old. His nutrition had at first been very poor, and he weighed but nine pounds at four months of age. At that time he was taking Eskay's food and sterilized milk. Later different foods were tried, such as Horlick's, Mellin's, and egg albumin. Finally a return to Eskay's food was made, and this diet was continued. About February 1st, or late in January, the child, being then about one year old, suffered from swelling and tenderness first of one and then of both knees. He could not use the legs at all. Next one arm became painful. The pain in the arms was intermittent, and to some extent that in the legs also. Beef juice was commenced in February

and continued until warm weather began. During February and March he lay on his back with his feet drawn up and making very little movement of his legs. In April and May he was better and had very little trouble except for a short relapse in April. About the end of May he grew much worse. For about two weeks before he was seen the gums had been "congested." On May 31st he had nosebleed and developed an ecchymosis about both eyes, giving the appearance of a large bruise. The gums bled on June 8th. Since then they had been purple. Severe nosebleed occurred on June 7th, and from this time the child had been pale, languid, and weak, unable to sit up, and had œdema, rapid respiration, loss of appetite, a poor digestion, and rather frequent vomiting.

Examination showed a child fairly well nourished but looking very ill, quite anæmic, and with the legs and feet very œdematous. Every touch of them elicited cries of pain. Movement of the arms was painful. The ecchymosis of the eyes had disappeared, no subperiosteal swellings were discoverable in the arms and legs and no petechiæ found. The gums of the upper incisors exhibited a slight purplish tint. The fontanelles were opened, the ribs beaded, the epiphyses of the wrists enlarged.

In the way of treatment, there was ordered the juice of one orange daily, one ounce of beef juice three times a day, the withdrawal of Eskay's food, the giving of equal parts of milk and water which should be Pasteurized at first but raw after a few days, the administration of iron, and the removal to the seashore. This treatment was commenced at once, the child being taken to Atlantic City on June 19th. On June 21st he was able to sit up and by June 22d all evidences of pain had disappeared. Ten days later all œdema had vanished, the color was returning and the child was playing. The after-history is uneventful. The symptoms of scurvy remained absent and the rickets slowly disappeared under treatment and in six months was nearly gone.

The diagnosis in this case was clear. The prognosis was somewhat uncertain, at first, owing to the very greatly impaired strength of the digestion, the marked anæmia and the œdema. The result, however, was brilliant, as it usually is in this disease.

In March, 1900, I received a letter from a physician asking me to see with him a case of rheumatism in a baby living in Germantown. Before we reached the house, he told me that he had used antirheumatic treatment in vain, and that he was beginning to suspect the existence of scurvy. In fact, he had recently ordered fruit juice and

vegetable soups, which, however, we found that the mother had not given, as the diet seemed to her unreasonable.

In the diagnosis of scurvy I entirely concurred after seeing the child—or rather the children, for the interesting feature is that we had here scurvy occurring in *twins*. One of these cases was, without exception, the worst I have ever seen. The history is as follows:

CASE VIII. Wallace McC., aged thirteen months, visited March 25, 1900. The child had been fed on Mellin's food with sterilized milk from the age of five months. About eleven weeks before seen by me the gums had become purple. About three weeks later pain and œdema developed in one leg below the knee and then extended to all the extremities. The child had become unable to move its legs in the slightest degree. There had been profuse sweating. The condition of the arms had later improved considerably.

Examination showed an anæmic and evidently ill and suffering child. He lay helpless on his back with his legs extended and swathed with cotton and wrappings. He was bathed in perspiration and wet with urine, for pain on motion was so great that moving, dressing, or changing of the child seemed almost impossible. He was indeed a pitiable object. Both legs and both thighs were greatly swollen throughout. Subperiosteal thickening of the tibiæ was easily discoverable and there was distinct thickening and tenderness of the right clavicle. Slight beading of the ribs was present. The fontanelle was nearly closed. The gums of the incisor teeth were somewhat swollen and red.

He was ordered orange juice, beef juice, and cod-liver oil with iron, and the use of raw milk without Mellin's food. Improvement was rapid, and in about a week pain had practically disappeared.

CASE IX. The twin brother, Lansing McC., had been fed in a similar manner and developed the disease at the same time, eleven weeks before I saw him. The first symptoms were redness of the gums as in the other case. After three weeks—as in the first case—pain developed in the legs and arms. This had, however, been much less severe than in the brother and had later disappeared. He had never been incapacitated by it.

Examination showed a well-nourished child with a pasty, anæmic appearance. The gums were swollen and very red. There was no discoverable pain or œdema anywhere.

The treatment ordered was the same as in the last case and the improvement was as rapid, although not, of course, as striking, since the condition was so much less grave.

These two cases are extremely suggestive. It is a curious fact that the disease developed at the same time in both children upon food which was not different from that used for months, and which had apparently agreed perfectly. The reason for this we can hardly understand, unless we assume the existence of an infection, and for this we have hardly sufficient ground. Again, it is interesting to note that whereas the symptoms in one brother ran to œdema and subperiosteal involvement, in the other the chief characteristics were the marked anæmia and the affected gums.

CASE X. The following case is to me extremely interesting from the point of view of the causative influence of food :

Lawrence MacE., eight months old when seen first on January 27, 1900. The child was a wretched, marantic specimen, always suffering from indigestion and diarrhœa. He had been fed for the first two months on the breast and bottle, then solely on malted milk, and then on condensed milk. When five months old he was placed upon barley water and white of egg for two months and, finally, for the last month upon Mellin's food. When first seen he exhibited some œdema of the feet and of the cheeks. Involvement of the limbs and of the gums was looked for, but not found. I started the child upon raw laboratory percentage milk, which contained barley water and a very low proportion of proteids and of fat.

On February 19, 1900, before circumstances had permitted more than a very slight increase of the percentages, the gums of the upper incisor teeth were found to be swollen and very purplish. Orange juice was at once ordered and continued, and the symptoms of scurvy rapidly disappeared. No immediate change was made in the food, although later, and as soon as the digestive power improved, the percentages were raised.

It is impossible in this case to determine whether the disease began to develop when the child was upon Mellin's food, as indicated by the œdema, or whether the involvement of the gums marked the onset of the disease, which was then to be attributed to the very low percentages of the milk mixture. It is to be noted that a certain small amount of starch in the form of barley water was present in the food ordered, but that there was no cooking of the food whatsoever. I am inclined to view the œdema as the earliest symptom.

CASE XI. The next case illustrates, as many of the others have done, the simulation of rheumatism by scurvy. It also illustrates the development of scurvy independently of any heating of the food, and upon nourishment, which seemed perfectly suited in every way.

Emily J., first seen when four months old. She had been a fairly healthy child, and was well nourished, although not gaining much weight. None of the various methods of feeding previously tried had agreed well. I placed her on a raw low percentage mixture of laboratory modified milk with barley water. This agreed nicely, and the weight steadily increased. By the middle of March, 1900, when six months old, she was the picture of perfect health, jolly, rosy, plump. She was now taking a mixture of fat, 3.75 per cent.; sugar, 7 per cent.; proteid, 1.50 per cent.

In April the child lost appetite, was fretful, and ceased to eat much or to gain in weight. The fat percentage was tentatively reduced to 3.50 per cent., and finally to 3 per cent., owing to continued indigestion. About the 1st of May she commenced to have pain in the legs, only discovered when they were handled in a certain way, and apparently situated somewhere about the ankles. There was still no gain in weight, owing apparently to the occurrence of sharp bronchitis with fever. She grew pale and had continued signs of indigestion.

Examination on May 18th, at the age of eight months, discovered pain on passive movements of the legs and indisposition to active movements of them. There were no swellings, œdema, or affection of the gums. The child had cut no teeth.

The diagnosis of incipient scurvy was made and the child given orange juice, beef juice, salt baths, oil massage, and, later, cod-liver oil internally. The 1.50 per cent. of proteid was increased to 1.75. The mixture was Pasteurized and barley water was stopped.

In a week the pain had practically gone, and the child had begun to increase in weight. By the end of May she was doing well, and the percentages in the food were now increased to fat 3, sugar 7, proteid 2.25.

What is most interesting about this case, apart from the simulation of rheumatic pain, is the fact that the scurvy developed on a mixture in which no heat was employed and in which the percentages seemed to have suited admirably. I am inclined to think, however, that possibly a still greater increase of proteid was needed; yet it is to be noted that recovery began after a very inconsiderable increase, 0.25 per cent., of the proteids was made, which seems to show that the orange juice was the curative agent. It is conceivable that the barley water may have been an etiological factor. Pasteurization was commenced after scurvy had appeared and was continued on account of the weather being quite warm, and for fear that changes might be taking place in the food.

CASE XII. The following case is like the last in that the cause of the attack probably consisted in a deficiency in the amount of proteids. Yet this is not certain.

Mary C., three months old when first seen, December 29, 1899. The child, always bottle-fed, had never thriven in spite of various changes in her diet, and was a feeble, emaciated specimen with extremely weak digestion. I gave her a Pasteurized low percentage laboratory milk with barley water, and gradually increased this in strength. The child meanwhile did remarkably well, and by the end of June, 1900, being then ten months old, had gained seven pounds in five months. By this time the percentage strength equalled, fat, 3 ; sugar, 7 ; proteids, 1.25. For two weeks the child seemed to have pain when the chest was grasped or the legs moved. Orange juice was given for three days, and the pain diminished, but as this seemed to produce diarrhœa it was stopped. A little later the proteid percentage was raised to 1.50, and then to 1.75. As this caused diarrhœa it was again reduced to 1.25, about the end of July pain returned in force. The child was so tender all over that it would move no more than its head, and its cries, when touched, were pitiable. There was never any discoverable swelling of the limbs or affection of the gums. Orange juice was again given, and in less than a week all pain had gone completely.

The laboratory milk mixture in this case had been Pasteurized from the beginning, and was still so during and after the attack of scurvy. The heating of the food may therefore probably be dismissed as an etiological factor. As stated, it seems most likely that the cause was a low proteid proportion.

CASE XIII. This next case is very like some of the preceding in its simulation of rheumatism, and like two others in that the possibility of the influence of trauma had been entertained. Toward the end of June, 1900, a medical friend asked me about his baby of nearly a year who he thought was suffering with rheumatism. Yet, he said, he was not sure, as he had always understood that rheumatism was unusual in infants. He had thought, too, of neuritis, but had excluded this. I suggested that the affection was probably scurvy, and urged that he give orange juice and change the diet. On June 27th, the father sent me a full account of the case, which I abridge :

The child was eleven months old. He had been fed since the second or third month on a scalded mixture of cream, milk, and water, with Eskay's food added. He had always been healthy and fat, but had no teeth. The first symptoms of scurvy were manifested early in June. The child did not move its legs nearly as freely as formerly, seemed to

have pain somewhere, and would no longer make an effort to stand when held upon his feet. There was no swelling of the legs. The nurse-maid was very careless, and it was feared that at some time the baby had had a fall. It was also thought that the baby might have taken cold from a careless use of damp diapers. Careful examination showed the right ankle tender when the foot was moved passively, and, after a few days, the left limb also, at some of the joints. The child did not move its limbs willingly. The upper extremities were never affected. Salicylate of cinchonidin was commenced in small doses, and Eskay's food discontinued. Improvement within a day or two was very great. The salicylate was given only for one or two days, and then replaced by orange juice. Within two or three days after orange juice had been started all pain disappeared, and the child moved its limbs as freely as it had ever done.

The salicylate may have had an analgesic action, although certainly not a curative one; but it is very probable that the stopping of the Eskay's food was the chief therapeutic factor. The milk mixture had been scalded previously, and this was not stopped later.

CASE XIV. This case is still another instance of the mistaking of scurvy for rheumatism.

I was asked by Dr. F. B. Gummey, of Germantown, to see with him a little patient of his, who was being treated unsuccessfully for rheumatism in one of the New Jersey seaside resorts. He believed the disease to be scurvy, and had advised antiscorbutic treatment, but the local physician still could not abandon his earlier diagnosis of rheumatism. On July 13th I saw the case with both physicians, and concurred in the diagnosis of scurvy. The history and result of the examination were as follows

William F., aged nine months, had never been ill previously. He had always been fed on a sterilized milk-and-water mixture. About two weeks before seen, he developed a widespread eczematous eruption, fever, pain on movement, and slight redness of the gums. This condition continued, with some irregularity of the bowels and evidence of impaired digestion. Except that grasping the child's chest seemed sometimes to give pain, the suffering soon centred itself in the legs, and was intermittent. Swelling of the lower extremities soon developed. There had been considerable sweating.

Examination showed an exceptionally hearty and well-developed child. The lower extremities were oedematous, especially the legs and feet. No subperiosteal thickening could be discovered, nor any distinct involvement of the joints. The child was unwilling to move its

legs, and passive movement gave pain. The gums were red, but not swollen or actually purple. There were seven teeth, the fontanelle was of normal size, and there had been but slight beading of the ribs. Orange juice and beef juice were ordered, and sterilization was stopped. Recovery was prompt.

In this case it appears very probable that the sterilization of the food may have been the cause of the disease, yet this is not certain.

The last two cases show the existence of hæmaturia as a prominent symptom of scurvy.

CASE XV. As in Case VI., I admit that I failed to make an early diagnosis; in fact, was misled entirely as to the real nature of the malady, and even later could not for some time make myself believe that it was really scorbutic. The case was a most perplexing one and the possibility of scurvy being present was by no means forgotten. The history is as follows:

Richard P., born July 22, 1899. The child was fairly well nourished, though decidedly below weight and having a tendency to sour vomiting. He had been fed constantly on Mellin's food and a very fat milk. On November 15, 1899, at the age of four months, he was first put upon raw laboratory percentage milk, to each bottle of which the mother added a teaspoonful of Mellin's food. The child did well and gained weight, the proportions of fat, sugar, and proteid being increased from time to time as indicated, the fat, however, being somewhat low on account of the vomiting. Possibly due to this fact, some symptoms of rickets developed. These soon began to improve decidedly under a stronger diet, and early in February the child looked and seemed remarkably well. He was now digesting a milk mixture of the strength of fat 3.25, sugar 6, proteid 1.25.

On February 17th, the baby being then six months old and in excellent health, I was sent for hurriedly on account of what was supposed to be an injury of the left arm. The mother strongly suspected that the nurse had hurt the child in some way. The arm had suddenly become painful and the child would not move it. Examination showed no discoverable cause for this. The gums were examined and found normal. By the next day the arm was entirely well and the condition was attributed to a slight wrench or similar cause.

On February 27th, ten days later, the baby became fretful and seemed to be in pain. Although he constantly moved his hands to his ears and pressure about them was painful, yet it was observed that passive movements of the legs also gave pain. The gums appeared normal. By March 3d, earache had disappeared and the legs were clearly free

from pain. The child now appeared to have pain in the abdomen. The left knee and ankle had become decidedly oedematous but not painful on passive movement. The gums were somewhat swollen but not red. The urine contained a small amount of albumin.

Again suspecting that I might possibly be dealing with scurvy, I ordered the Mellin's food to be omitted from the mixture. On the next day a sharp bronchitis with fever developed. Movements of the legs caused no pain, and the swelling of the left leg was somewhat less. The urine was smoky in appearance and contained abundant albumin and numerous red blood-corpuscles, but no casts. On the day following, March 5th, a minute patch of purplish discoloration was visible on the gums of the lower central incisors, the only teeth. Some pain on moving the legs had reappeared. The diagnosis of scurvy was now very probable, yet it seemed possible that with the severe bronchitis there was some nephritis, which accounted for the symptoms. The child was given the benefit of the doubt, however, and orange juice was prescribed.

Up to March 8th the bronchitis had continued severe, with fever and rapid respiration. The urine was much redder than a nephritis ordinarily exhibits, and there had been no casts found. Owing to indigestion, orange juice was stopped on this date, although the diagnosis of scurvy seemed now beyond question. By March 10th, the urine showed very little blood. Recovery from this time on was rapid and uneventful.

The history of this case and the diagnosis are of considerable interest. The first very temporary pain in the arm did not give sufficient ground for a diagnosis of scurvy. Later, the whole course of the scurvy was masked by the existence of the symptoms of earache, severe bronchitis, and indigestion, which rendered the discovery of the degree of pain in the legs extremely difficult. The small purplish spot on the gums was trivial and of later development. In reality it was the hæmaturia which decided the diagnosis in my mind, and to the examination of the urine I was led especially by the presence of the slight oedema.

Hæmaturia is a not infrequent symptom of scurvy, and sometimes, according to Barlow, the only one. In this case it was the most persistent as far as could be discovered. The case illustrates very well the intermittent character of the pain in the legs, as it so often occurs in this disease.

The orange juice was given for a very short time—only three days—and then withdrawn, before the symptoms of scurvy had disappeared. I hesitate to regard it as having had any material influence in the cure

of the disease. It would appear more likely that in this case the withdrawal of the commercial food was the sole factor in the cure. It is interesting to note that the milk was not cooked in any way at any time.

CASE XVI. This last case was even more puzzling than the preceding one. The diagnosis was based entirely on the occurrence of a hæmaturia which resisted other treatment, but promptly and permanently ceased after the administration of orange juice was commenced.

Francis V. W., aged five months when first seen by me in November, 1899. The child had been fed in various ways, including laboratory modified milk, but had not thrived, and was a thin specimen of about nine pounds only, always the subject of severe indigestion. Careful modification of his milk with the addition of barley water, still done at the laboratory, changed this condition, and he began and continued a steady gain. Finally he reached, at about the age of nine months, a percentage mixture of fat 4, sugar 7, proteid 1.50, as large a proteid a percentage as it had been possible to use safely, and seeming sufficient for his needs. The food was always uncooked.

At this time, about March, 1900, I found that he was passing urine of a smoky tint, which stained the diaper, and which contained numerous blood-cells; and on inquiry I learned that a number of weeks before he had had similar urine for about a week, and again, ten days ago, for a few days. The baby seemed perfectly well in every way.

From now on the blood in the urine was constantly present, and generally to such an extent that the color was distinctly red. The general health began to suffer somewhat, the child losing weight, being fretful, and at times seeming to have pain on urination. This last, however, was uncertain. Poultices were used over the bladder with the idea that there might be a cystitis present. Then hydrastis, and later ergot were tried. Sometimes opium was used, as the child was very restless at night and seemed to be suffering. Later, the evidences of pain disappeared, but no treatment had the slightest influence on the hæmaturia, which continued unabated. There was never any affection of the gums (there were no teeth), nor any swelling or discoverable pain in the limbs.

The hæmaturia continued for somewhat over a month, when I concluded that it was probably scorbutic in origin. Orange juice was started with astonishing results. In a few days the hæmaturia stopped completely and permanently, the treatment with orange juice being meanwhile persisted in. The return to good general health was rapid, and increase in weight recommenced.

I have already called attention to the fact stated by Barlow, that the hæmaturia is, sometimes, the sole symptom of scurvy. This justified diagnosis of scurvy in the case just reported. It is of course possible that the bleeding may have been due to a calculus or other cause; but the prompt cessation of the hæmaturia and of all other symptoms with the beginning of orange-juice treatment was almost too startling to be a mere coincidence.

For the development of the disease in this case, I see absolutely no cause unless it be the use of a too low percentage of proteid in the mixture—a thing which could not be avoided, and which was not changed at all until after the scorbutic symptoms had disappeared.

It is not my purpose to enter into a detailed description of the features of scurvy or even to analyze the cases I have recorded. The striking characteristics of each have already been emphasized. There are only two or three points to which I would like to draw special attention.

It is evident that although the cause of scurvy seems clearly to be dietetic, yet there is no one dietetic fault which can be held responsible. This is the common experience with the disease, and the cases here detailed are but additional proof of it. Oftenest we find that scorbutic children have been fed upon commercial foods, and there seems every reason to believe that these constitute a powerful etiological factor. The collective studies of the American Pediatric Society, in which, as one of the committee, I was greatly interested a few years ago, put this statement beyond question. In at least one of the cases reported here the simple omission of a patented food from the dietary was followed by disappearance of scurvy.

There are cases on record in which the sterilization of milk has seemed to produce the disease. In my own experience, this is not a prominent factor, and I am convinced that its power is overrated. I would call attention to the number of cases in my list in which no heating at all was employed. In none of the sixteen is there any absolute proof of the harmful action of heat. Yet it is to be suspected in some of them; and that cooking of the food is capable of producing scurvy seems to be beyond question in some reported cases.

In some of my cases it is probable that the fault lay in the lack of a proper proportion in the different elements of the mixture; oftenest a too low percentage of proteid; but in many cases of scurvy we are entirely unable to discover just what the factor is. It may readily be—in fact it must be—that it varies with different children.

With regard to symptoms, it is most important to remember that the affection of the gums is generally not the earliest symptom and that

the disease may exist without it. Indeed, it is usually absent if no teeth have appeared. Pain somewhere, generally in the legs, is oftenest first seen, and it is due to this fact that so many mistakes in diagnosis are made. So many of my cases bear out the common experience that rheumatism, more than any other disease, is erroneously diagnosed when scurvy is really the condition. Yet we may occasionally have scurvy without pain being a prominent feature. Indeed, although the diagnosis is easy in typical and well-developed cases, and when one has the possibility of the presence of the disease in mind, it is by no means so easy in incipient or atypical cases. One should be far from regarding the failure to make a diagnosis as a reproach to any physician.

Treatment of the disease is most simple, as my case-histories and the general experience with the disease show. A proper alteration of the diet and, even without this, the administration of fresh fruit juice, is sufficient to work a cure which seems almost miraculous. Only in cases where debility has grown extreme, or where intercurrent maladies exist which possibly interfere with treatment, need we fear a fatal result. I have had one fatal case, not included in this list of histories, in which the inanition from persistent chronic enterocolitis was so great the child died—not, however, of scurvy.

That several of the cases of my list recovered promptly on the use of fruit juices without any change of diet is a noteworthy fact, since in the great majority of reported cases, at least in this country, some alteration of the usual diet has also been made. This is a warning against too quickly altering the food which for certain reasons we have deemed best, simply on the ground that scurvy has developed. A curable scurvy is much to be preferred to a possibly fatal diarrhoea or gastritis, the result of a diet which may precipitate these. So, too, with regard to the heating of milk. Even if we suspect that such heating is the cause of scurvy in a certain case, we should not hastily abandon it if we see any good reason for continuing it. Where raw milk can be used safely it is to be preferred.

DISCUSSION.

DR. H. A. HARE said the cases of Dr. Griffith were of great importance, not only from the stand-point of the specialist of children's diseases, but also from the stand-point of the general practitioner, who constantly sees, without doubt, cases that he calls rheumatism which are not rheumatism. Dr. Hare's attention was called, several years ago, to the frequency of joint affections which were called rheumatism but were due to other causes. Since

then he has found a number of cases that he would previously have diagnosed rheumatism to have been quite different. The cases in children, reported by Dr. Griffith, are by no means so rare as perhaps some have supposed. Dr. Griffith, as a pediatricist, has seen an unusual number of them, but Dr. Hare had seen a sufficient number to make him feel that they are not uncommonly seen by the general practitioner. Nearly ten years ago he saw the first of these cases in which he made a correct diagnosis, but he did not make the correct diagnosis until he made an erroneous one which cost the child great deal of time and suffering. At that time, the incorrect diagnosis was excusable, because ten years ago attention had not been called to scurvy in childhood. At that time while rickets was recognized scurvy was not recognized as "frequent" or "infrequent" in the case of children or adults.

The case occurred in the child of a physician. The prominent symptom was intense spinal tenderness. Dr. Hare asked for the opinion of an orthopedic surgeon and that given by one of the best in the city, agreed with the belief of Dr. Hare that the case was one of spinal disease. The child was advised to be strapped to a board day and night. It was so kept in its baby coach, or carried about for a number of months, until it occurred to Dr. Hare that the case was one of scurvy. The gum symptoms and petechiæ were absent, there was nothing except tenderness of the spine. A proper regulation of diet and administration of remedies produced a cure almost as rapidly as in the cases reported by Dr. Griffith.

Another case of scurvy, one in a young baby, was called meningitis by the attending physician, because it was characterized by screaming. This screaming was more incessant and violent than any Dr. Hare had heard. The family history was that in a large family of children, the three eldest had died with symptoms of screaming, excessive pain on movement, and some rigidity, which was probably functional. The diagnoses were either tubercular meningitis or meningitis or cerebro-spinal meningitis, and these cases, too, may have died of scurvy.

A child of wealthy parentage was fed with milk from a Jersey cow, bought for that special purpose. Yet this child was suffering with complete paraplegia of the lower extremities, bleeding gums, and a few petechiæ when it was brought from the country to its city house. Dr. Hare recognized that it had scurvy and cited it to show that it exists not only amongst the poor, but, also, amongst the children of the well-to-do. There are cases in which the subperiosteal hæmatoma takes place. Attention has been called to this by the French clinicians, who record enormous hæmatomata occurring in the periosteum of the thigh. Sudden large swellings appear which lead to all sorts of diagnoses, sarcoma, osteosarcoma and other conditions.

Another class of cases, very important for study, are the laryngeal. One used to hear of patients dying of peritonitis but now one learns of them dying of appendicitis. Fifteen or twenty years ago children suffered from spasmodic croup. This condition is very much less frequent now, because spasmodic croup is often due to rickets or scorbutus. The correction of dietetic errors and healthy living will tend to relieve these spasms.

The more Dr. Hare sees of these cases the more is he convinced that scurvy is a disease of the children of the rich and rickets a disease of the children of the poor. This may seem a rather artificial difference, but it is the comment made from experience.

DR. D. J. MILTON MILLER said it is important that a disease which so closely simulates rheumatism should be distinguished and recognized as remarked by Dr. Griffith. There is no doubt of the great rarity of acute rheumatism in young children, and of the probability that almost all these cases (cases of joint affection occurring in children between the ages of four or six and eighteen months) are scorbutic and not rheumatic; and yet it is equally certain that acute articular rheumatism does occur, occasionally, in young infants. The testimony of very good observers is conclusive on this point. Henock, Koplik, Flint, Rotch and Stager have all reported rheumatism in infants between the ages of four and eighteen months. Reference was not made to very young infants; the joint affections occurring at or after birth are generally of pyogenic origin. Two of the above observers, Flint and Rotch, saw the joint affection in their cases followed by valvular heart disease within a year of the attack. A case of rheumatism in an infant of nine months was seen by Dr. Miller himself a couple of years ago. Scurvy was very carefully looked for in that case, and it was decided to be absent, and that the joint symptoms were due to the rheumatic poison; especially on account of the very quick response to the action of the salicylate of sodium. In a few days the infant was well. The differentiation of scurvy and rheumatism rests mainly on two factors—namely, dietetics and the use of salicylate of sodium. If, in a joint affection in an infant between four and eighteen months or older, orange juice is used and the child recovers, the case is not rheumatic; and, on the other hand, if a joint affection gets well in a few days with salicylate of sodium, then one is warranted in assuming that the case is rheumatic in its nature.

The etiology of scurvy is peculiar. Dr. Miller agreed with Dr. Griffith that it is due to some dietetic error. Wherein the error lies no one knows or has ever yet been able to discover. It occurs under all sorts of diet, largely however in those fed on artificial, sterilized and preserved foods; indeed it seems to have increased *pari passu* with the use of artificially prepared and preserved foods. A case was seen by Dr. Miller due to the constant use of oat-meal a few years ago. The child had pronounced scurvy at ten months; it had had no other food since the second month. In reporting that case he found but one other similar to it. Sometimes scurvy is produced by sameness of diet. A few years ago F. P. Henry, in the Philadelphia Hospital, observed scurvy in a number of old people who lived exclusively on bread and tea.

In reporting a case of scurvy a few years ago, Dr. Miller called attention to the fact spoken of by Dr. Hare; the rareness of this disease in cases that apply at dispensaries. Dr. Miller's case was a dispensary case, and at that time he collected forty-six cases, in addition to some thirty-eight that Dr. Crandall had collected some years previously. The vast majority of these

cases were in children of the well-to-do. The children that apply at the dispensary are fed on all sorts of food; they get a mixed diet at an early age, generally table food, which is usually fresh food, and they do not get scurvy for that reason. It is pre-eminently a disease of the children of the well-to-do.

DR. J. A. SCOTT asked Dr. Griffith if he made a detailed study of the blood in these cases of scurvy. Dr. Scott had not heard Dr. Griffith speak of the counting of the reds and whites and especially of the differential counting of the whites, but then Dr. Scott had not heard the whole paper.

The blood of children seems to behave differently in disease from that of the adult. Thus at times there seems to be a condition between pernicious anemia and leukæmia that is so intermediary that it is difficult to say to which disease it belongs. This led Dr. Jaksch to describe a class of cases as pseudoleukæmic infantum, but which is probably true leukæmia in infants.

It would add much interest to the paper if the blood was carefully studied. The knowledge, at present, of the blood in scurvy is limited; it is supposed to be similar to a secondary anæmia, slight reduction of reds, greater reduction of hæmoglobin; sometimes an increase in the whites—mainly lymphocytes.

DR. A. G. BAKER asked what kind of beef juice was used. Was the beef juice pressed out at home?

DR. H. B. NIGHTINGALE asked that Dr. Griffith would go further into the subject of differential diagnosis. He reported a class of cases seen by most physicians. Cases put in splints that should not have been. There are also many cases of hip-joint disease that have been treated as rheumatism or neuritis. Most surgeons state that they frequently see cases of disease of joints that have been erroneously treated as some other disease.

Pain was cited by Dr. Griffith as the principal symptom in infantile scurvy. Dr. Nightingale asked that Dr. Griffith would speak more fully upon pain in the hip and thigh as a symptom of the various diseases of this region. Dr. Hare, in his discussion, alluded to it and went further with the description of symptoms by which the disease was to be recognized. All have to depend largely upon text-books, but one must first have a name for the disease and then find out whether it is right or not. In studying botany a plant is first observed without knowledge of its name and from certain characteristics it is traced to its species. This method should be applied to diseases. Dr. Griffith was asked to say more on the symptom of pain in the thigh and tell how diseases exhibiting this symptom may be differentiated from each other.

DR. F. T. STEWART said that in connection with the symptom of painful limbs he thought that the frequency with which osteomyelitis is confounded with rheumatism should not only be mentioned but emphasized, because of the extreme gravity of the mistake.

DR. L. J. HAMMOND asked if there was any characteristic appearance about the gums of these scurvy cases. It is known that there are quite a few therapeutic agents that produce red, inflamed and suppurative gums and especially a disease of the gums known as gingivitis.

DR. GRIFFITH, in answer to the several questions asked, said that the characteristics of the gums is the typical swollen spongy, purple gum, which does not show any signs of suppuration, but which often bleeds, and which sometimes covers over and conceals the teeth. He did not know any other condition of the gums which resembles this. This is the appearance in typical cases, but there are all grades down to a very small ecchymotic and scarcely noticeable patch.

Of the blood he had made no examinations, as nearly all the cases he had seen were in consultation, and the opportunities for study were insufficient. There has been very little careful study made, including differential counts of the leucocytes, at least in this country.

The beef juice used was that expressed from almost raw beef.

As to the diagnosis he had not been able to enter into the matter extensively in this paper. One can hardly apply to medicine the principles used in the study of botany or any other exact science. Of course in all medical diagnosis one must balance symptoms one against the other, and search for a certain characteristic group. The most important diagnostic symptom is a vague pain in the bowels. This is so strongly suggestive of scurvy that we must search for reasons to form any other diagnosis possible. This pain will be found not on the joints but perhaps near them. The swelling is not in the joint, but about it, thus differentiating the disease from articular rheumatism.

Osteomyelitis and neuritis might occur he suggested, but neither of them has at all the complex of symptoms characteristic of scurvy.

Pain, anæmia, œdema, affection of the gums, and pseudoparalysis combined in an infant point forcibly to infantile scurvy. Dr. Griffith did not agree with Dr. Miller that acute rheumatic treatment will test the diagnosis. In one of Dr. Griffith's cases the child was temporarily benefited by salicylate of strontium, but did not get well—and then promptly—after it was taken off a commercial food and put on orange juice. The salicylate was purely an analgesic. It produced malnutrition. The therapeutic test with orange juice will, however, be very positive.

He has nearly always noticed scurvy only in the families of the well-to-do. He has seen but two cases in dispensary practice. One of them is included in his list, the other the child of which Dr. Miller spoke. There was not a child in the list of the cases presented that was not cared for carefully by the parents. Dr. Griffith again insisted on the importance of pain as a diagnostic symptom. If this is kept in mind, so that one is on the watch for other symptoms, many bad blunders will not be made.

The Treatment of Dilatation of the Stomach.

BY BOARDMAN REED, M.D.

[Read December 26, 1900.]

When a cancer or other tumor obstructs the pylorus, a surgical operation offers the only hope, and even that must fail unless done at a very early stage—at a time when the diagnosis is only possible, if at all, with the aid of the most recent methods of interrogating the abdominal organs. The other mechanical causes of obstruction, such as the scars of healed ulcers, adhesions of the stomach to an adjacent organ, kinks in the small intestine, etc., belong also to the surgeon, except that a form of obstruction resulting sometimes from a prolapse of the stomach is often amenable to non-surgical measures.

The latter comprise diet, lavage, abdominal massage, electricity, gymnastics of the trunk muscles, a few medicinal remedies, and all the hygienic means by which the health and strength of the patient can be built up. Among such means may be included hydrotherapy, climato-therapy, and a judicious alternation of rest and out-door exercise.

Let us consider first a most important class of what may be called the non-surgical dilatations of the stomach—to wit, those dependent upon spasm of the pylorus following severe and generally old neglected cases of hyperchlorhydria or of acid gastric catarrh. These are likely to be stubborn because nearly always accompanied by chronic intestinal indigestion and often by intestinal catarrh with neurasthenia and greatly lowered nutrition. The diet is especially important in this form of dilatation. The articles which usually agree best are milk, cream and butter, eggs, stale bread toasted (but not too hard, and not the coarsest kind of bread) purees of the blander vegetables, plasmon, sometimes fresh cheese, sugar when the condition of the liver and of the intestinal digestion does not cause it to disagree, olive oil and other fats, beef juice and often a small allowance of finely chopped beef, but either no meats in the ordinary form or only small portions of them, as well as of fish and oysters; no other kinds of shell-fish. Nothing irritating or very stimulating to the gastric glands should be allowed, and this rules out entirely the condiments, except a little salt; also acids and acid fruits, including tomatoes, and renders undesirable the coarser kinds of bread, very coarse cereals and imperfectly prepared vegetables, coffee and tea and the alcoholic beverages without exception. Recent experiments have shown that the fats and sugar are especially efficacious in lessening the secretion of the gastric juice, though they are often con-

traindicated by the intestinal complication. The starch foods, except when partly dextrinized, though indispensable, are difficult of digestion in these cases and must be very thoroughly insalivated, which can best be done with the dryer forms long masticated, and all these should be taken very early in a meal—never at the end of it. Even then in bad cases it is well to give taka-diastase with such foods or just before meals to assist in converting the starch.

In this, as in all the forms of gastric dilatation, very large meals and any overloading of the stomach with either food or drink, must be absolutely prohibited. Whether only two or three moderate meals or a greater number of smaller ones at shorter intervals, are to be taken daily, is a question to be determined in each case by itself, since no general rule will apply to all. Sometimes frequent small feedings agree well, but less time is then left for the debilitated organ to rest and recuperate between, so that as a rule, you will probably find the best curative results to follow the plan of giving three times a day, a moderate amount of bland, digestible food as concentrated in form as possible, so as not to distend unduly, and then, if necessary in certain cases to keep up the nutrition, you may have additional nourishment administered by enema once or twice daily. The allowance of sufficient liquid with each meal to dilute, and thus lessen the acidity of the gastric juice, will often assist in relaxing the spasm of the pylorus and thus in curing the dilatation; but the amount of liquid taken should never be enough to overdistend the stomach. No cases are so difficult to diet as those of hyperchlorhydries, whether or not their stomachs happen to be dilated. In the food of all except the poorest persons, in this country at least, highly seasoned, stimulating proteid viands usually predominate. Caterers, cooks and waiters all seem in a conspiracy to force on hyperchlorhydric patients food and drinks prepared so as to suit especially atonic stomachs, and therefore injuriously irritating for the opposite kind. Then, if, after indulging liberally in the customary stimulating foods and beverages, such a patient suffers from burning pains, as he is very apt to do, the trouble is often aggravated instead of relieved by the treatment prescribed. Whether he tries some quack medicine, consults the drug-store man, or calls in a physician who knows only one form of dyspepsia, the chances are that the remedy depended upon will be a combination of ginger or capsicum with pepsin and a bitter tonic, and often full doses are added of the very drug from an excess of which he is suffering—that is, hydrochloric acid.

The medicinal treatment of these cases of dilatation dependent upon hyperchlorhydria should include especially alkalies, local sedatives and

antispasmodics. You may administer sodium bicarbonate in half-teaspoonful, or even one to two teaspoonful, doses two hours after meals, or prepared chalk instead when there is diarrhoea, or calcined magnesia when there is constipation. Atropin sulphate, gr. $\frac{1}{100}$ to $\frac{1}{80}$, several times a day will be needed also in the worst cases to control the excessive secretion, and I have fancied that the addition of three or four grains of extract of yerba santa to a pill containing the atropin or belladonna and nitrate of silver, gr. $\frac{1}{4}$, tends to the production of more prompt results.

But many of these cases resist both diet and the strongest medication for some time, and here intragastric faradization with the current of high tension will prove the most rapidly effective of any means at our command, serving at once to increase muscular contractions and diminish secretion as already fully explained by me in previous articles. Massage of the abdomen is contraindicated in all cases of excessive HCl. The necessity of mental and sexual rest is important, but need not be dwelt upon here.

The pain resulting from the excessive HCl secretion sometimes amounts to an intolerable gastralgia, but in such cases opium and morphine should be avoided as tending in the end to increase gastric secretion according to recent experiments. Administer instead very large doses of alkalies, and atropine, either hypodermically or by the mouth, dissolved in warm, not hot, water, after emptying the stomach by lavage. This may be followed when necessary by a spray of menthol or cocaine, 1 grain to the ounce, applied inside the stomach by the Einhorn spray apparatus.

Gymnastic exercises designed to strengthen the abdominal and trunk muscles generally, will assist greatly also in toning up the musculature of the stomach itself, when the hyperacidity has been controlled by the means already described.

There remain now to be considered the cases of so-called atonic dilatation. A certain proportion of these probably owe their origin to a former hyperchlorhydria which through lack of treatment persisted until the gastric glands became exhausted. Under this head of atonic dilatation it will be convenient to class all cases in which there are no indications of obstruction of the pylorus either mechanical or spasmodic—no tumors, adhesions or kinks affecting the stomach or the duodenum—and no existing excess of hydrochloric acid.

In the treatment of this class the diet will differ mainly (1) in not requiring a rigid exclusion of the irritants, stimulants and sour things; (2) in not permitting a liberal use of fats and sugar which would lessen

still further the gastric secretion and aggravate the indigestion; (3) in requiring a greater restriction of the amount of fluid ingested, and (4) in permitting a much freer use of meats, meat juice, fish, oysters, and all the more digestible forms of animal food, since the stimulating property of this kind of diet is no objection, but rather an advantage in the atonic conditions now under consideration, and such foods contain usually a large amount of nourishment in a small bulk. They are besides less fermentable than most other forms of nutriment. But care must be taken that an undue proportion of proteid food is not too long continued or nutrition will suffer; and it will often be necessary to assist its digestion by administering bitter tonics and artificial digestants at the same time. An exclusive milk diet usually aggravates these cases on account of the excessive bulk of it necessary, and for this reason the full Weir Mitchell rest cure, notwithstanding its brilliant success in so many other ailments, often fails in patients who have true atonic dilatation of the stomach.

On the other hand, the worst cases will generally respond satisfactorily to a modified rest treatment in which concentrated food, both proteid and carbohydrate, take the place of milk, especially when in administering the massage and electricity an unusual amount of time and attention are devoted to the abdominal region. The abdominal massage both in gastrectasis and gastroptosis needs to be given by specially trained manipulators, with the particular object always in view of crowding upward the stomach and intestines while the patient exhales, and effecting contractions of both the visceral muscles and those of the abdominal wall by very deep though never rough or painful kneading while the patient's hips are kept higher than the shoulders, so that gravity may assist the replacement.

The aggravated cases demanding such a modified rest treatment are nearly always in women and are in large part attributable to their exceedingly irrational and unhygienic mode of dress. Hence, when these patients again begin to go about, they should wear instead of the usual corset a reform waist which exerts only a slight or no constriction of the upper abdominal organs, while it admits of having the skirts all suspended from the shoulders. A snug-fitting elastic belt for the lower abdomen, however, often proves of great service by limiting the sagging tendency of the viscera.

Faradic electricity in the atonic cases can generally be given effectively through the stomach from front to back, using as full doses as can be borne with the largest-sized electrodes and this treatment can be repeated daily with advantage for many weeks at a time. More

speedy results can often be obtained by the employment of the current from a coil having a short coarse wire, applied directly to the inner walls of the stomach by means of an intragastric electrode. Meanwhile the stomach contents should be analyzed at least every two weeks to note the effect upon the secretion. This is usually stimulated by such a current at first, but later is depressed.

The simpler forms of hydrotherapy applicable in atonic dilatation include cold sponge baths and salt rubs to the whole body followed by friction with a coarse towel, and locally alternate hot and cold jet douches, or alternate affusions of hot and cold water to the epigastric region.

The gymnastic exercises need not differ from those required for the hyperchlorhydric cases. Pulley exercise is often helpful even for patients in bed, the pulley being attached to the ceiling or foot of the bed, and for others rowing is particularly useful.

The cases of atonic dilatation in which downward displacement has contributed to the causation need the same treatment already described except that the abdominal massage, electricity and exercises need to be more energetically and persistently carried out, and in addition a special abdominal supporter with truss-like springs should be worn constantly except when the patient is in bed. Of course in all cases of dilatation secondary to tuberculosis, heart disease, Bright's disease, or other systemic affection, no treatment would be effective which was not addressed mainly to the primary condition. General debility, anæmia, etc., whether a cause or consequence of the dilatation would demand their appropriate treatment, which should include all the possible hygienic and climatic aids as well as suitable tonic medication. Strychnine has been supposed to exert a directly tonic action upon the gastric muscle, but I have never seen it do any good in these cases.

In all the forms of gastric dilatation, it is necessary that the stomach should be completely empty at least once in the twenty-four hours. When its propulsive powers cannot effect this (especially in the obstructive and catarrhal forms) lavage must be resorted to. The washing out is best done before breakfast. I shall not discuss here more fully the technique and indications for lavage because it is the best understood one of the curative measures useful in dilatation of the stomach, and because so much time and space have been already occupied in the consideration of the less familiar though equally important details of the treatment.

DISCUSSION.

DR. FRANCIS T. STEWART said that, although not mentioned by Dr. Reed, there is a surgical treatment for gastrectasia. It was introduced in 1891 by Bircher and seconded by Weir in 1892. It is called gastroplication. Recent literature indicates that in selected cases, in cases in which neither spasmodic nor mechanical stenosis of the pylorus is present, just such cases as were referred to by Dr. Reed, or in cases where an obstruction has been relieved, a cure is to be expected. Gastroenterostomy is perhaps a greater favorite, because, if there is any obstruction to be overcome, the patient will recover even though the obstruction has been overlooked.

DR. ALBERT BERNHEIM suggested the administration of large doses of bromides for the relief of hyperchlorhydria in cases of the kind reported. For instance, four grammes of bromide of soda given by enema would be a suitable dose. Dr. Bernheim related the history of a case of dilatation of the stomach occurring in a man suffering from gastric disorders for ten years. He was a beer brewer and drank daily from thirty to fifty glasses of beer. In instance of the degree of dilatation of the stomach it was cited that in washing out the stomach of this patient some pieces of green salad were recovered which had been eaten three days before. The principal treatment in this case was lavage. In the beginning there was absolutely no reaction for free acid upon Congo red or the Günzburg's test; after three or four months of lavage a slight reaction for free acid was observed. The patient had complained of loss of appetite for the last nine years, but now the desire for food has returned; he does not drink any beer now. He has gained about twenty-five pounds in weight; he is practically cured, though he still uses lavage occasionally.

DR. BOARDMAN REED said he did not refer to the surgical treatment, because that belongs to the surgeons and his paper was long enough. There are cases in which the operation of gastroplication might be indicated. It might be preferable for people who cannot pay for proper skill and medical treatment continued for several months. Dr. Reed is a thorough believer in the sentiment of the elder Dr. Mitchell, that the chief end of medicine is to obviate surgery. He is the last one to detract from the brilliant achievements of surgeons, who have done glorious things in the last twenty years; and he feels that surgeons agree with him that anything that can be successfully done medically ought not to be done surgically. Every case of atonic dilatation of the stomach, in which the patient can be given the proper diet and treatment and there is no possible obstruction of the pylorus or parts below, is amenable to treatment by mechanical measures. There may be exceptions to this but Dr. Reed has not found them.

Administration of bromide of soda to hyperchlorhydric cases may be good treatment given by enema. Given by the mouth it sometimes does not agree. One of the French authorities has, though perhaps without good reason, claimed that both the bromides and iodides always tend to increase the secretion of hydrochloric acid when given by the mouth.

One point in regard to Congo red used as a test for hydrochloric acid. There is no more common error than the use of Congo red paper as a test for hydrochloric acid. It is a test for any free acid. Of course, if the reaction is pronounced, the paper turning a very dark blue, the presumption is that hydrochloric acid is present; but it is not positive proof, since any free acid in excess will change the Congo red paper to a bluish color.

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